T E C H N I C A L M E M O R A N D U M

Utah Coal Regulatory Program

June 11, 2004

TO: Internal File

THRU: Dana Dean and Wayne Western, co-leads

FROM: James D. Smith, Environmental Scientist

RE: Lila Canyon Extension, UtahAmerican Energy, Inc., Horse Canyon Mine, C0070013 Task # 1859

SUMMARY:

Permittee's Action		DOGM's Action	
Original submittal	02/11/2002	Designated as PM02B (Task # 23)	
		Determined Administratively Complete	02/25/2002
Published	Feb – Mar 2002		
		TA (informal)	03/26/2002
		Informal Conference	04/21/2002
Response to TA	04/24/2002	Designated as PM02B-1 (Task # 1411)	
		Tech Memo – Hydrology	07/29/2002
		TA	07/19/2002
Response to TA	12/06/2002	Designated as PM02B-2 (Task # 1348)	
		Tech Memo – Hydrology	03/31/2003
		TA	04/08/2003
Response to TA	02/24/2004	Designated as Task # 1859	
		Determined Administratively Complete	03/26/2004
Published	Apr 2004		
		Tech Memo – Hydrology	06/11/2004
		TA (projected date)	06/15/2004

The Lila Canyon Extension Permit Application Package (PAP) has been submitted and reviewed as an extension to the existing Horse Canyon Mine Mining and Reclamation Plan (MRP). The current Horse Canyon Mine permit area contains approximately 1,330 acres, and the Lila Canyon extension contains approximately 4,700 acres for a total of 6,030 acres.

UtahAmerican Energy, Inc. (UEI) has proposed to develop new surface facilities near the mouth of Lila Canyon in order to mine coal in six federal leases. The federal leases are contained within the "North Block Logical Mining Unit" as approved by the United States Bureau of Land Management (BLM) January 1, 1994.

The current disturbed area is about 74 acres. All but 16.18 acres of that acreage is in Phase 3 reclamation. The Division recently approved a change in post-mining land use on the 16.18 acres that have not been reclaimed, plus some undisturbed acreage: the land and structures, including the Horse Canyon Well, have been donated by UEI to the College of Eastern Utah (CEU) for use as a science field camp for Utah universities.

The permit application was a Significant Permit Revision, so publication of a notice for public comment was required. Because of the long time period between the Division's April 2003 TA and UEI's February 2004 response, the Division considered the permit application to be inactive and required the applicant to publish again.

The Southern Utah Wilderness Alliance (SUWA) identified a number of issues during the Informal Conference held on April 21, 2002. UEI did not attempt to address those issues in the April 24, 2002 submittal. The Division's July 29 TA included comments on SUWA's concerns, and the Findings sections identified some additional information needed in consideration of some of SUWA's comments.

TECHNICAL ANALYSIS:

GENERAL CONTENTS

PERMIT APPLICATION FORMAT AND CONTENTS

Regulatory Reference: 30 CFR 777.11; R645-301-120.

Analysis:

The name on the submitted amendment is Horse Canyon Mine – Part B – Lila Canyon Mine. The proposed Lila Canyon Mine is also referred to as the Lila Canyon Extension of the Horse Canyon Mine, or simply the Lila Canyon Extension or Lila Extension.

The old surface facilities in Horse Canyon will not be used for mining in the Lila Extension. Part of the disturbed area at the Horse Canyon Mine has been reclaimed and has received Phase II bond release. The Division recently approved a change in post-mining land use on the remaining disturbed area (16.18 acres) that has not been reclaimed: the land and structures are to be donated by UEI to the College of Eastern Utah for use as a science field camp for Utah universities. This change in use is supported by the University of Utah's Center for Mine Land Redevelopment and the Emery County Board of Commissioners.

The Lila Canyon Mine amendment is an extension to an existing permit. Although the Lila Canyon Mine amendment is largely formatted as a stand-alone document, there are baseline data and other information in the current Horse Canyon Mine MRP that are relevant to the Lila Canyon Extension. There are two separate water-monitoring plans, one for the Lila Canyon Extension and another for the Horse Canyon Mine. There is a PHC for the Horse Canyon Mine and another in the Lila Canyon Extension, which utilizes data from the Horse Canyon Mine.

Assuming approval of the Lila Canyon amendment and eventual bond release at Horse Canyon Mine, the Lila Canyon amendment will eventually become the bulk of the MRP. It would make the permit more usable now if the Horse Canyon and Lila Canyon parts were unified, eliminating the need to refer to a separate Lila Canyon and Horse Canyon Mine binders.

There are two figures named Figure 7-1, one in Volume 6 and another in Volume 7. The Figure 7-1 in Volume 6 is followed by an unnamed figure, presumably Figure 7-2. The Figure 7-1 in Volume 7 is after Chapter 8 and easily overlooked. UEI needs to name these figures in a clear and concise manner, place them in the plan so they are easy to find, and include all of them in the Table of Contents.

Findings:

R645-301-121.300, There are two figures named Figure 7-1, one in Volume 6 and another in Volume 7. The Figure 7-1 in Volume 6 is followed by an unnamed figure, presumably Figure 7-2. The Figure 7-1 in Volume 7 has been placed after Chapter 8 and easily overlooked; it is not shown in the Table of Contents. UEI needs to name these figures in a logical, clear, and concise manner, place them in the plan so they can be readily found, and list all of them in the Table of Contents.

REPORTING OF TECHNICAL DATA

Regulatory Reference: 30 CFR 777.13; R645-301-130.

Analysis:

Resource maps and plans and site-specific information in the Lila Canyon Extension PAP are based on, among other sources, the old PAP for the Kaiser South Lease area. A CD with a copy of the text of the Kaiser South Lease PAP has been provided to the Division for use in preparing the TA and CHIA. The Kaiser South Lease PAP is not intended to be appended to the Lila Extension PAP, as stated by UEI in the letter that accompanied the February 24, 2004 submittal.

The Division has received comments in the past that the various terms for coal mine waste that are used in the PAP are confusing. The terminology is explained in Section 536 and in Appendix 5-7 of the PAP. The Permittee has replaced the term “rock-slope material” with "rock-slope material/mine development waste" in some sections of the PAP.

By the definitions in the Coal Mining Rules, coal-processing waste and underground-development waste - which is waste rock excavated, moved, and disposed of from underground mine workings - are coal mine waste. Coal-mine waste deposited on the surface forms a refuse pile. The PAP distinguishes a sub-category of coal mine waste: slope-rock waste or “rock-slope material/ mine development waste” is the coal mine waste to be produced by construction of the entry slopes - material that will be basically free of coal, segregated from other waste in the refuse pile, and used as a base for construction of a shop-warehouse pad. The introductory discussion under Section 536 states that coal-mine waste will be deposited in the refuse storage area shown on Plate 5-2. Section 528.320 states that areas for disposal of rock-slope material and underground development waste are adjacent and conjoined and will be treated as one area or structure, one refuse pile. Appendix 5-7 and other sections of the Lila Canyon Extension PAP address reclamation of the refuse pile.

The Division has received comments in the past that the treatment of coal mine waste and that the location and extent of coal-mine waste is not clear. Some statements in the Lila Canyon Extension PAP could be more precise in their language and can seem contradictory and confusing if read outside the context of the entire Lila Canyon Extension PAP. For example, it can be inferred from Section 537.200 that some waste might be placed outside the designated refuse pile in indeterminate, undesignated “low areas”; from Section 537.250 that slope rock material might be used in pads other than the shop-warehouse pad, then left there and reclaimed “in place”; and from Section 537.240 that there might be more than one waste pile. In spite of such unfocused language regarding some details, the overall plan for handling, storage and

disposal of coal mine waste and reclamation of the refuse pile is sufficiently clear and meets the requirements of the Coal Mining Rules. The plan calls for one refuse pile; all refuse will go to that pile, be handled in a manner to protect ground- and surface-water resources, and will be covered with a minimum of four feet of subsoil and topsoil at reclamation.

The refuse pile capacity is 44,400 cubic-yards (Section 520 – Refuse Pile; Appendix 5-7).

Findings:

Reporting of Technical Data is sufficient to meet the requirements of the Coal Mining Rules.

ENVIRONMENTAL RESOURCE INFORMATION

Regulatory Reference: Pub. L 95-87 Sections 507(b), 508(a), and 516(b); 30 CFR 783., et. al.

GEOLOGIC RESOURCE INFORMATION

Regulatory Reference: 30 CFR 784.22; R645-301-623, -301-724.

Analysis:

Geologic information includes a description of the geology of the proposed permit and adjacent areas down to and including the stratum immediately below the lowest coal seam to be mined. The coal seams and adjacent strata include a saturated zone that will almost undoubtedly be intercepted by mining. Geology influences the occurrence, availability, movement, quantity, and quality of potentially impacted surface and ground water.

Local, perched bedrock and alluvial aquifers in Little Park Wash and along Patmos Ridge are separated from the saturated zone by a thick section of low permeability strata. These aquifers support small discharges from seeps and springs scattered across ground-water emergence zones, which are located mostly in the bottoms of small drainages.

The plan includes geologic information in sufficient detail to assist in determining the PHC of the operation upon the quality and quantity of surface and ground water in the permit and adjacent areas, including the extent to which surface- and ground-water monitoring is necessary, and whether the proposed operation has been designed to prevent material damage to the hydrologic balance outside the permit area. Resource maps and plans and site specific information are based on published geologic information, mine plans from the nearby Sunnyside

and South Lease areas, and exploration and drilling records of Kaiser Steel, U. S. Steel Corporation, and Intermountain Power Agency (IPA).

The Division has received comments in the past that there is not sufficient resource information to allow determination of the PHC. There was particular concern that there is not sufficient resource information for Range Creek drainage to evaluate the potential for adverse impacts.

The Division has determined that it is reasonable not to include the Range Creek drainage in the PHC determination because adverse impacts to resources in Range Creek drainage are not reasonably expected. To clarify for the public record why adverse impacts to Range Creek drainage are not expected, the Division has required that UEI augment geologic and other resource information in the PAP to include the Range Creek drainage. Chapter 7 contains a geologic map and cross-section (Plates 7-1A and 7-1 B) that include Range Creek drainage, and the geology of the Range Creek drainage is discussed in Chapter 7 and the PHC (Appendix 7-3). The PHC includes an evaluation of why adverse impacts to the Range Creek drainage are not probable.

Seeps have recently been found in a deeply incised canyon located at the southwest corner of the Lila Canyon Extension. Geologic information for this area is adequate for the requirements of the Coal Mining Rules.

Boreholes S-1 through S-23 were drilled between 1948 and 1975. S-24 through S-32 were drilled in 1980 and 1981. In 1993 and 1994, IPA-1, IPA-2, and IPA-3 were drilled. IPA-1, IPA-2, and IPA-3 were completed as piezometers in 1994. Copies of borehole logs for IPA-1, IPA-2, IPA-3, S-14, S-27, and S-32 are in Appendix 6-1. (The Lila Canyon Extension PAP does not indicate whether or not there are logs for other boreholes.) The borehole logs show lithologic characteristics, including physical properties and thickness of each stratum that may be impacted. In addition to the boreholes, coal seams and adjacent strata were measured at seventeen outcrop locations in 1974 and 1975. Lithology and thickness of the coal seams and adjacent strata, based on the boreholes and measured out-crop sections, are shown on Plate 6-5. Locations of the boreholes and outcrop measurements are on Plate 6-2.

Acid- and Toxic-forming Materials

Because the strata above the Sunnyside Seam will not be removed, the Coal Mining Rules require that samples be collected and analyzed from test borings, drill cores, or fresh outcrops (R645-301-624.200). The Division has received comments in the past that analyses for acid- and toxic-forming materials in the strata above and below the coal seam to be mined have not been done.

Planned mining will leave a roof and floor of coal, so the analyses of floor and roof material from IPA-1, IPA-2 (roof only), and IPA-3 in Appendix 6-2 are pertinent to the requirement for analysis for acid- and toxic-forming materials in the strata immediately above and below the coal seam to be mined. Appendix 6-2 also contains analysis results for the "middle" coal samples from the three IPA bore holes. For all samples, pyritic sulfur (dry basis) ranged from 0.07 percent to 0.48 percent and total sulfur from 0.70 percent to 1.17 percent (Appendix 6-2).

Drill-logs in Appendix 6-1 note that pyrite was visible in many cutting or core samples, providing some indication of acid- and toxic-forming potential in strata above and below the Sunnyside Seam.

Strata above and below the Sunnyside Seam were sampled in boreholes S-24 and S-25, and results of analysis results for potentially acid- or toxic-forming materials are in Appendix 6-2. The proposed location for the Lila Canyon Extension access slopes is approximately three miles north of boreholes S-24 and S-25, but the access slopes will pass through lower Blackhawk strata similar to those tested at these two boreholes. Two of twenty-one samples from these boreholes had over 1 percent total sulfur, the highest being 1.26 percent. Maximum pyrite content was 0.74 percent, in the sample with the highest total sulfur. All samples had acid-base potentials greater than (–5 tons $CaCO_3$)/(1000 tons of material). One sample had elevated boron; another had elevated boron and SAR. The conclusion of the ACZ Inc. report on these samples (Appendix 6-2) is that there is no acid-producing potential and that proper handling and burial, such as that planned by UEI, will eliminate potential toxic-forming problems.

Experience throughout the Wasatch Plateau and Book Cliffs Coal Fields indicates characteristics of the Blackhawk Formation are consistent over large areas and do not vary widely or change abruptly. Impacts, adverse or otherwise, from acid- and toxic-forming materials are rare. Data on acid- or toxic-forming materials from boreholes S-24 and S-25 and the IPA boreholes, along with information from other coal mines in the Book Cliffs coal field, provide good indications of expected acid- or toxic-forming characteristics of the rock that will be encountered in constructing the proposed Lila Canyon access slopes.

In a letter dated April 22, 2002, UEI requested exemption from R645-301-624. A copy of the letter is included in Appendix 6-2. The requested exemption is based on the following:

- A statement from the BLM's Environmental Analysis for lease U-32083 that there is no history of problems with acid- or toxic-forming materials at the nearby Sunnyside Mine, which operated for over 80 years;
- Analyses from boreholes S-24 and S-25 located two miles south of the Lila Canyon Extension provide the required information on the strata that will be encountered during construction and operation of the Horse - Lila Canyon Mine;

- All material brought from the mine during construction and operation will be treated by burial as though it is acid- or toxic-forming; and
- Coal-mine waste brought to the surface by mine construction and operation, including slope-rock underground development waste, will be tested for acid- or toxic-forming potential before burial.

Although it is true that there have been no problems with acid- or toxic-forming materials at the nearby Sunnyside Mine, acidic slurry-pond water carrying iron and other minerals seeped from the base of a refuse pile. The environment in the receiving channel raised the pH and reduced the mineral load. Even though there were no offsite problems or impacts because of the buffering environment, a potential for acid and toxic mine drainage clearly exists in coals and waste materials in the Book Cliffs Coal Field.

UEI uses the Sunnyside Mine as an example of why there is no need to perform further analysis of samples from test borings or cores for acid- and toxic-forming materials. The PAP discusses how the handling and disposal of coal-mine waste at the Lila Canyon Extension is designed to avoid acid- and toxic-drainage such as occurred at the base of the Sunnyside Mine refuse pile. As explained in Section 6.5.5.1 and Appendix 5-7, the Lila Canyon Extension refuse pile differs from that at Sunnyside in several ways that will preclude the events that caused acid-drainage at Sunnyside: the Lila Canyon refuse pile will not contain reject from coal washing, which is higher in sulfur than non-concentrated materials; the refuse pile will be placed in an excavation rather than placed on the surface; the refuse pile will be placed in lifts and compacted; the refuse will be covered with 4 feet of subsoil and topsoil rather than left exposed on the surface; and runoff will be diverted to the sedimentation pond.

As mining proceeds, materials overlying and underlying the coal seam can be exposed to water and oxygen underground, within the mine, and there is some potential to generate acid or toxic products. Rocks of the Mesaverde Group are carbonaceous, so persistence of acids and related toxins in water in the mine and adjacent strata is unlikely: the analyses from boreholes S-24 and S-25 show acid-base potentials from all analyzed zones is greater than –5 tons $CaCO_3$/1,000 tons material. The mine is designed so there will be no natural discharge or drainage from the portals. Discharge pumped from the mine will be subject to federal and state water-quality standards under the UPDES permit, and the discharge will be more thoroughly analyzed quarterly under the proposed operational monitoring plan in the PAP. Adverse impacts, and particularly material damage, from formation of acid or toxic water within the mine are unlikely.

Nevertheless, UEI has committed to periodic sampling of the materials to be placed in the refuse pile as a further precaution. Samples will be collected and analyzed five times during construction of the rock-slope tunnels and from every 6,000 tons of waste rock placed on the refuse pile during mine operation. The reclamation plan specifies 4 feet of subsoil and topsoil will be placed over the refuse pile. The slope-rock underground development waste used to

build the pads will be left in place for final reclamation as part of the refuse pile and buried with 4 feet of subsoil and topsoil (Chapters 2, 5, and 7, and Appendix 5-7).

The Lila Canyon Extension refuse pile is designed for handling and burial of coal mine waste in a manner that will minimize infiltration of water into the pile, minimize the formation of acid or toxic drainage, and minimize acid, toxic, or other harmful infiltration to ground-water and drainage or discharge to surface-water. Based on the design of the refuse pile, the reclamation plan and the geology, hydrology and climate of the area, the Division has found that the probability of acid- or toxic-impacts from the materials to be placed in the refuse pile is minimal, and information that might be collected through additional boring, coring, and analysis would not serve to further reduce the potential impacts from the handling and disposal of coal mine waste. As authorized under R645-301-626, the Division is waiving further analyses of samples from test borings or cores for acid- and toxic-forming materials in the strata immediately above and below the coal seam.

Engineering Properties

Engineering properties of the strata immediately above and below the coal seam to be mined are listed in Table 6-6. Data are based on core samples from boreholes S-18 and S-22.

Bore Holes

S-32 was drilled in 1981 in SE1/4SW1/4 Sec. 6, T. 17 S., R. 15 E., south of the Lila Canyon Extension area, and completed as a piezometer in the lower Grassy Member and Upper Sunnyside Seam of the Blackhawk Formation. The Permittee has included the drill-log, a Chronology of Development, and Water Pump Tests and Samples in Appendix 6-1. At least four water level measurements and one suite of water-quality analyses were done at S-32 in 1981 and 1982. The Permittee visited this piezometer in 2002, attempted to measure water levels, but found S-32 unusable.

IPA-1, IPA-2, and IPA-3 were completed as piezometers in 1994. Water levels were measured from 1994 through 1996, and UEI resumed measurements in 2000.

The Horse Canyon water-supply well and the Minerals Development Corporation (MDC) Well (Plate 7-1) were bored in Horse Canyon to monitor and produce water in the small alluvial aquifer at the mouth of Horse Canyon (Section 724.100, pp. 6-7). The MDC well has - to the best of UEI's knowledge - been sealed.

Kaiser Steel installed piezometers A-26, A-28, and A-31 in the alluvium of Little Park Wash in 1981, but they are no longer accessible. The exact locations of these piezometers are not known, and there are no hydrologic or geologic data from these piezometers (Section

724.100, p. 10; Section 6.5.1, p. 14). A-26, A-28, and A-31 are non-usable for obtaining further hydrologic information.

Fluid levels were reported for several exploratory boreholes at the time they were bored. In some cases, the fluid reported in boreholes appears to have been drilling fluid rather than ground water: borehole S-26 was completed as a piezometer in August 1980 but was dry within a month of completion and was subsequently cemented to the surface.

Stratigraphy

Stratigraphy of the Blackhawk Formation is described on pages 5 – 9 of Chapter 6. The Sunnyside Member, which is dominantly sandstone, includes the Upper and Lower Sunnyside Coal Seams, with the Grassy Sandstone above the coals and the Sunnyside Sandstone beneath them. The Horse Canyon Mine was operated in the Lower Sunnyside Seam, which is also the seam that is planned to be mined in the Lila Canyon Extension.

Saturated Strata

A large section of the Horse Canyon Mine, including the Geneva exploration tunnel and the rotary dump, are below the water level indicated in the IPA piezometers. The PAP reports that, generally, underground flows from rock slopes and gob areas into the Horse Canyon Mine were small. Only when the mine intercepted the Sunnyside Fault in deeper, down-dip areas was significant water encountered. Prior to suspending operations, the mine pumped water from the workings near the Sunnyside Fault to keep them from flooding. Some of the water was used for mine operations; the rest was discharged intermittently to the surface.

Coal at the Horse Canyon Mine is underlain by the Sunnyside Sandstone, a marine sheet sandstone. Lines (1985) did extensive petrographic work on porosity and permeability in the similar Star Point Sandstone in the Wasatch Plateau; Table 1 of the Lines lists permeability values determined by Lines for the Star Point Sandstone, as well as values for the Blackhawk Formation at the Soldier Canyon Mine.

Much of the Horse Canyon Mine is below the potentiometric surface indicated by the IPA piezometers and the car-dump sump. Because the Sunnyside Sandstone, which underlies the Lower Hiawatha Coal Seam, is known to transmit ground water in the Sunnyside area, it is occasionally considered as a potential aquifer. Sandstone and shale of unknown thickness form the floor of the Geneva – Horse Canyon Mine and did not transmit water into the mine. Water entered the Horse Canyon Mine in large amounts only when the Sunnyside Fault was intercepted in deeper, down-dip areas (Section 6.4.1, p. 8). Possible explanations for the dryness of the Horse Canyon Mine before the Sunnyside Fault was encountered are briefly discussed in the PAP (Section 6.4.1, pp. 8-9):

- Shales in the mine floor could have impeded ground-water flow into the mine;
- The sandstones under the coal were not saturated;
- They lacked sufficient hydraulic conductivity to transmit water;
- Most of the mine simply was not deep enough to encounter a saturated zone;
- There was unreported inflow where the mine encountered a saturated zone; or
- The east-west faults isolated the mine from saturated zones around the IPA piezometers.

Regardless of the reason, the Horse Canyon mine was relatively dry despite being below the potentiometric surface indicated by the IPA piezometers. This is consistent with experience throughout the Book Cliffs and Wasatch Plateau Coal fields and indicates that the sandstone units are isolated vertically and laterally by low-permeability siltstones and mudstones, with poor interconnectivity and communication between them. The Division anticipates that the Lila Canyon Extension will be similar to the Horse Canyon Mine and that there will be little water inflow from unfractured rock and inflow from east-west trending faults will be localized: the mine is planned so as to avoid the Sunnyside Fault.

Minor inflows of water are anticipated from the Geneva exploration tunnels (Section 6.6.1, p. 37). Because underground exploration work performed by BXG in 1993 found water in the Horse Canyon Mine at approximately 5,870 feet, UEI assumes that the Geneva exploration tunnel is flooded, the tunnel will be intercepted by mining operations in the Lila Canyon Extension, and the water from the tunnel - in excess of what will be used in coal production - will need to be pumped from the mine (Section 724.100, p. 12).

Saturated strata in the lower Blackhawk Formation are separated from the perched zones in the upper Wasatch Group by upper Blackhawk, Price River and undifferentiated North Horn-Flagstaff Formations, strata that contain approximately 80 percent clays, shales, siltstones, and mudstones. Plastic or swelling clays that can seal faults and fractures and inhibit lateral and vertical flow of ground water are abundant (Section 724.100, p. 20). (*Fisher and others 1960*, which is listed in the References of Chapter 6, is given as the reference for percentage of clays, shales, siltstones, and mudstones.)

Structure

The Sunnyside Fault, other faults, the elevation of the Horse Canyon Mine workings – in particular where the Sunnyside Fault was encountered and water flowed into the Horse Canyon Mine, and other potentiometric, geologic, and hydrologic information relevant to understanding the ground water in the saturated strata of the Blackhawk Formation are discussed in section 724.100 and shown on Plate 7-1. In 1993, underground work performed by BXG indicated the elevation of water in the Horse Canyon Mine was 5,870 (Section 724.100, p. 12). The Permittee concludes that water levels haven't changed since mine operations ceased and 5,870 probably represents the water level in the rest of the mine (Section 724.100, p. 12 and Appendix 7-3, p. 6).

Because the water level in the mine in September 1982 (last sampling of 2 Dip) must have been near the elevation (5,827 feet) of 2 Dip sample site and the 1986 level is also very near this elevation (perhaps below it), it appears as though the water level in the mine has changed little since operations ceased.

The PAP states in Section 724.100 on page 18 that there are no springs have been identified in the Blackhawk Formation. It states in section 731.520 that in the vicinity of the proposed portals, no water issues from the strata above or below the coal outcrop (p. 53). The springs in Stinky Spring Canyon issue n from the upper Mancos Shale, near the contact of the Blackhawk Formation and Mancos Shale.

The coal seam crops out at an elevation of approximately 6,500 feet in the vicinity of the rock-slope tunnels. The plan indicates the tunnels will intercept the coal seam at approximately 6,300 feet (Figure 7-1, Volume 7).

Underground mining always has a potential for impacting surface water, ground water, and other surface resources. The PAP states in Section 728.200 that subsidence effects are expected to be minimal due to the amount of cover and massive rock strata between the mining and the surface. Coal-seam elevations determined from boreholes are on Plate 6-4 - Cover and Structure Map. Geologic information is sufficient to assist in preparing the subsidence control plan.

Faults

The Lila Canyon Extension PAP contains a description of regional geology and hydrology, including faults and their interaction with ground water. Faults are shown on Plates 6-1, 6-2, and other maps. Fault locations are based on previous mapping by Kaiser Corporation consultants, drilling, exposures at the outcrop, fault interceptions in the Horse Canyon Mine and Geneva exploration tunnel, and information from drilling. The detailed mapping on Plates 6-1 and 6-2 shows fault alignments that may differ from those on some USGS maps and other the published maps (Section 6.4.2, p. 10).

The Division has received comments in the past that effects of faults on movement of ground water are ignored, especially in the “regional aquifer”. Faults can effect direction and magnitude of ground-water flow; however, fault gouge and plastic or swelling clays can seal faults and fractures. Based on experience from the Horse Canyon Mine, little ground-water inflow is expected from the east-west faults. The major inflow to the Horse Canyon Mine was from the Sunnyside Fault, and interception of the Sunnyside fault by mining operations in the Lila Extension is not anticipated as it is projected to lie east of the Lila Canyon workings.

Vertical displacements of faults in the area range from 15 feet to more than 275 feet, with displacement diminishing toward the east (Section 6.5.3.3; Table 6-5). Vertical offset at the outcrop is 205 feet on the Central Graben Fault and 195 feet on the Williams Draw fault. The Entry Fault is offset 50 feet in the central part of the lease, but offset may disappear before reaching the outcrop (Plate 6-2). En-echelon faulting or fracturing near major displacements is common in the Geneva Mine, particularly in the transverse, easterly trending normal-fault systems. Roof falls have been abnormally high in these areas, even though the strata indicate competent roof rock (Section 6.5.3.3, p. 24).

Faults may affect flow, direction, and magnitude of both lateral and vertical flows (Section 724.100, p. 20). Subsurface water inflow associated with fault or fracture systems is possible; however, conditions are not expected to be significantly different than those associated with the Geneva, Columbia, and Sunnyside mines, so ground-water inflow from faults and fractures systems is not expected to be significant in the Lila Canyon Extension (Section 6.6.1, p. 37).

Ground-water conditions in the Lila Canyon Extension are projected to be similar to those in the Geneva and Sunnyside Mines. Flows of water encountered while mining were reduced to seeps or dry up in a short period of time, so this water is thought to have been "in place" with little or no recharge. Drill holes in the South Lease property below Williams Draw did not encounter ground water within 1 to 1.25 miles of the coal outcrop, so subsurface water is not expected near the cliff escarpment at the Lila Canyon Extension (Section 6.6.3.1, p. 38).

Findings:

Geologic Resource Information is adequate to meet the requirements if the Coal Mining Rules.

HYDROLOGIC RESOURCE INFORMATION

Regulatory Reference: 30 CFR Sec. 701.5, 784.14; R645-100-200, -301-724.

Analysis:

Sampling and Analysis

Analysis reports in Appendices 7-2 and 7-6 for samples collected in 1993, 1994, 1995, and 1997 indicate water-quality analyses were done using methods in Standard Methods or 40 CFR 136. Analysis methods used on earlier samples are not indicted on the reports, but analysis methods were most likely to industry standards and equivalent to Standard Methods or 40 CFR 136. The Permittee commits that all water-quality analyses performed to meet the requirements

of R645-301-723 through -724.300, -724.500, -725 through - 731, and -731.210 through - 731.223 will be conducted according to the methodology in the current edition of "Standard Methods for the Examination of Water and Wastewater" or the methodology in 40 CFR Parts 136 and 434. Water-quality sampling will be conducted according to either methodology listed above when feasible (Section 723, p. 4).

Baseline Information

Ground-water Information

Fluid levels were reported in a number of boreholes. Drill holes S-26, S-27, S-28, and S-31 were cased in 3-inch PVC pipe with bottom perforations for water monitoring; however, cement seals were faulty, allowing the PVC pipe to fill with cement. Drill hole S-26 was reported dry the week prior to cementing. Reports by Kaiser stated that, with the exception of drill hole S-32, subsurface water was not detected in holes drilled (using air, mist and foam) within 1.25 miles of the cliff face. No apparent increase in fluid level could be attributed to ground-water inflow from these holes, some of which were open for two weeks (Section 724.100, p. 8). Fluid initially reported in some boreholes might have been drilling fluid rather than ground water.

S-32 was drilled in 1981 in SE1/4SW1/4 Sec. 6, T. 17 S., R. 15 E., south of the Lila Canyon Extension, and completed as a piezometer from the lower Grassy Member down to the upper Sunnyside Sandstone of the Blackhawk Formation (driller's log in Appendix 6-1). Appendix 6-1 also includes a Chronology of Development, Water Pump Tests and Samples, a series of water level measurements, and one suite of water-quality analyses. The Permittee located S-32 in 2002 and attempted to measure water levels, but found this piezometer unusable.

IPA-1, IPA-2, and IPA-3 were drilled in 1993 and completed as piezometers in 1994. Water levels were measured from 1994 through 1996, and UEI resumed measurements in 2000.

In 1980, Kaiser Steel unsuccessfully attempted to convert exploratory boreholes S-26, S-28, and S-31, located south of the Williams Draw Fault, to ground-water observation wells or piezometers. Offsetting shallow piezometers were then bored. A-28, the offset to S-28, also was unsuccessful (Table VI-3). A-26 and A-31 were developed to observe ground water in the alluvium of Little Park Wash. Table VI-3 does not indicate that A-26 and A-31 have been plugged and abandoned; however, UEI has no data on them (Section 6.5.1, p. 14) and considers them unusable for ground-water monitoring (Section 724.100, p. 10).

Two borings described as wells are located in the alluvium of lower Horse Canyon. The one identified as the MDC Well has - to the best of UEI's knowledge - been sealed (Section 724.100, pp. 6-7). The Horse Canyon Well is located nearer the old Horse Canyon Mine surface facilities (plate 7-1). The location of water right 91-185 in the nw/4 of Sec 9 (Table 7-2, p. 29)

matches the location of the MDC Well, but this water right has probably been used for the Horse Canyon Well also.

As part of the post-mining land use change approved by the Division on January 6, 2004, the Horse Canyon Well is to be transferred to CEU as a potential source of culinary water for the Utah universities science field camp. (According to R645-301-731.400, the permittee retains responsibility for proper management of this well until bond release. What constitutes "proper management" is not explained, but R645-301-765 – Permanent Casing and Sealing of Wells indicates the permittee retains the obligation to seal, cap, backfill or otherwise properly manage "as required by the Division in accordance with R645-301-529.400, R645- 301-631.100, and R645-301-748", so "proper management" does not seem to apply to maintenance or operation of the well but rather to permanent closure.) There are presently no plans to transfer any other wells (Section 731.400, p. 50). The Lila Canyon Extension PAP is out-of -date as it does not contain the information on the post-mining land change and future transfer of the Horse Canyon Well to CEU; the PAP discusses the well as though it will remain part of the Horse Canyon Mine.

The PAP contains no information on the capability of the Horse Canyon Well to serve as a water-supply source, or of the water quality or quantity. The condition of this well is briefly described in the supplemental information accompanying the December 6, 2002 submittal (there is a non-working pump on top of a concrete cap that encloses the well, and there is no direct access to the water) but this information needs to be included in the PAP. Water-level and water-quality information from this well could help in characterizing the hydrologic balance of the alluvial aquifers, but because the Horse Canyon well is to be transferred to CEU, UEI will no longer be involved in maintenance or operation of the well, which would be necessary to access the water. If the well becomes operational, the Division may require UEI to provide information on water quality and quantity.

The Division has received comments in the past that extrapolation of the potentiometric surface on Plate 7-1 ignored faults, ignored the car dump, ignores the most recent data, and covers an unacceptably large area based on just three closely spaced data points. The Division notes that the potentiometric surface also does not extend to the 1993 BXG measurement in the Horse Canyon Mine (which is, however, closely congruent with the surface as drawn). In spite of these limitations, the potentiometric surface and the projected water-coal contact on Plate 7-1 provide a reasonable approximation of the depth to water in the coal seam and in water-bearing strata above and potentially impacted strata below the coal seam, and this information is sufficient to meet the requirements of R645-301-724.100. The Division will evaluate additional information as it is received.

Regional Aquifer

The Division has received comments in the past concerning ground water:

- That there is a regional aquifer;
- That the regional aquifer is not described,
- That there is no information on the discharge area and discharge rates for the regional aquifer; and
- That UEI has not established that the saturated zone is not an aquifer.

The July 2000 Environmental Assessment (EA) of the Lila Canyon Project prepared by the BLM labels the "coal formation" of the Blackhawk Formation as a regional aquifer, and mentions springs issuing from the Blackhawk at lower elevations within the canyons. However, the 1985 survey of the Horse Canyon area by JBR and the 1993 - 1995 survey of the area around Lila Canyon by EarthFax did not identify any seeps or springs issuing from strata below the upper Price River Formation (Plate 7-1A).

Utah DWR informed DOGM of an unnamed intermittent drainage at the southwest corner of the Lila Canyon Extension where bighorn ewes and lambs congregate, their presence indicating a water supply. Previously unknown seeps, which flow from near the top of the Mancos Shale, were found in this drainage in 2000. The seeps are located inside the coal lease boundary but just outside the proposed permit area - in Section 26, T. 16 S., R. 14 E. The Permittee initiated monitoring of these seeps (L-16-G and L-17-G) in 2002. The drainage, identified as Stinky Spring Wash on maps in the PAP, is included in the Surface Water Characterizations in Appendix 7-7.

Although these seeps are not a water supply and have limited use, they appear to be an important source of water for Bighorn sheep, specifically in the early spring. Water chemistry is consistent with waters from the Mancos Shale in the Book Cliffs (Section 724.100, p.19). Plate 7-1 shows these seeps could be related to the Graben Fault. Reference is made to Appendix 7-7 for information on the relationship of the seeps to faulting, but Appendix 7-7 contains no discussion of this subject. These seeps are at an elevation of approximately 6,000 feet, close to the elevation of the potentiometric surface (Plate 7-1), so the source for the water flowing from these seeps could be connected to the saturated zone that will be intercepted by the proposed mine. In Appendix 7-3 (p. 10), it states that "…being 500 to 600 feet below the coal seam, there is no potential for Lila Canyon Mine to negatively impact this spring or recharge sources." Because they are below the coal seam, subsidence should not impact these springs, but recharge or flow to these seeps could be interrupted. The Permittee needs to more fully evaluate the hydrogeology of these seeps, whether their source is regional, intermediate, or local in extent, and what impacts the proposed coal mining might have on them.

Saturated lenticular sandstones of the Blackhawk Formation have been encountered in the IPA piezometers and the Horse Canyon Mine (Section 724.100, p. 10). This is typical of conditions found in the Wasatch Plateau and Book Cliffs Coal Fields. The Permittee proposes that formal aquifer names should not be applied to ground-water systems in the permit and

adjacent areas; however, the geometry, continuity, and boundary conditions of lithologic units and potential flow paths suggest that ground-water systems in bedrock groups differ sufficiently for an informal designation based on bedrock lithology. The Permittee designates the Colton and Flagstaff/North Horn as the Upper zone and the Price River, Blackhawk, and Mancos as the Lower zone. Ground water occurs in perched aquifers in both zones.

No springs have been found in the Castlegate Sandstone, situated between the Upper and Lower zones. This apparently unsaturated zone of separation is most likely results from clay horizons that inhibit downward recharge of ground water from the Flagstaff-North Horn Formation and the limited recharge area exposed on the steep cliff faces of the Price River and Castlegate strata.

The IPA piezometers were completed within the first formation with identifiable water above the coal seam, the Price River Formation. It states on page 17:

> The water monitoring wells show water levels above the lower zone containing the coal seam in area of the mine; however, the zones recorded are not connected to the lower groundwater zone. As reported in the Castlegate Sandstone section, no springs or water bearing zones were identified in the spring and seep inventories or in the drilling of the water monitoring wells in the formation. Therefore, indicating that the monitored zones are perched and are isolated from the lower groundwater zone.

This seems to be indicating that the IPA piezometers were either completed in a third saturated zone between the Upper and Lower zones or completed in the Upper zone. The statements in this paragraph need to be clarified.

Lines' model applied to Range Creek

The Division has received comments in the past that the cross-section in Figure 8 in Lines (1985, The ground-water system and possible effects of underground coal mining in the Trail Mountain area, central Utah, USGS Water-Supply Paper 2259) is a model for Range Creek and that it clearly supports discharge to Range Creek from a regional aquifer. The study by Lines provides valuable insight into ground-water systems in the Wasatch Plateau, specifically to the Trail Mountain area. Much of the information can be applied to the Book Cliffs coalfield also.

However, the situation presented diagrammatically in Lines' cross-section differs from the reality of the hydrogeologic environment at Lila Canyon and Range Creek in at least two important aspects discussed in the PAP: 1) Along its entire course, Range Creek has not eroded deeper than the upper Price River Formation, so a thick section of low-permeability rock isolates the creek from the projected saturated zone in the lower Mesa Verde group; and 2) Range Creek

is approximately 6 miles from the Lila Canyon Mine (Section 724.200, p. 23). The cross-section in Lines has no scale, but proximity of the stream and saturated coal seam is implied. In addition, in the reaches nearest Lila Canyon, Range Creek is significantly higher in elevation than the potentiometric surface of the saturated strata, as illustrated on Plate 7-1B.

Mine Inflow

Except for water that flowed into the Horse Canyon Mine and was used as part of the coal-mining operation, there has been no diversion of this water for beneficial use (water rights were filed on this in-mine water by IPA: water encountered by mining and used underground is not subject to appropriation through water-rights, but water encountered by mining that is brought to the surface for beneficial use is subject to appropriation through water rights). The PAP states that underground water from the saturated zone will probably be encountered and used during development and operation of the mine in the Lila Canyon Extension. Water that cannot be used or stored underground will be discharged to the surface if it meets applicable effluent limitations (742.146, p. 61).

Information on inflow to the Horse Canyon Mine is sparse. Generally, underground flows from rock slopes and gob areas into the Horse Canyon Mine were small. Only when the mine intercepted the Sunnyside Fault in deeper, down-dip areas was significant water encountered. Prior to suspending operations, the Horse Canyon Mine pumped water from the workings near the Sunnyside Fault to keep them from flooding. Some of the water was used for mine operations; the rest was discharged intermittently to the surface in Horse Canyon. According to sources referenced in Chapter 7, the estimated average discharge rate was 0.2 cfs, but there was no estimate of in-mine consumption (724.100, p. 11).

A large section of the Horse Canyon Mine, including the Geneva exploration tunnel and the rotary dump, is below the potentiometric surface that is indicated on Plate 7-1. Because underground exploration work performed by BXG in 1993 found water in the Horse Canyon Mine at approximately 5,870 feet, PAP includes the assumption that the Geneva exploration tunnel is flooded, the tunnel will be intercepted by mining operations in the Lila Canyon Extension, and the water from the tunnel - in excess of what will be used in coal production - will need to be pumped from the mine. Because of undulating floor and unknown void areas, it is impossible to determine the amount of water that would be pumped. DOGM has specified planning to include a mine discharge of 500 gpm maximum (724.100, p. 12).

In-mine flows within the Horse Canyon mine were monitored for quantity and quality at several locations, which are shown as blue stars on Plate 7-1. There are also data from S-32, located to the south of the Lila Canyon Extension area (Appendix 6-1).

The Division has received comments in the past that UEI had not described seasonal variation in ground water – especially with maps or cross sections in compliance with Coal

Mining Rule R645-301-722.100. Water levels for the IPA piezometers are tabulated in Appendix 7-1. Water levels have varied through time, but the data do not evidence distinct seasonal variation. Nevertheless, UEI has mapped a set of spring and fall water-level elevation contours on Plate 7-1, which serves to emphasize the minor seasonal effect. Figure 7-2 graphically shows the temporal variations.

Baseline Data Adequacy

The Division has received comments in the past that the PAP contains numerous water samples from the mined area of the Horse Canyon Mine that do not represent pre-mining conditions, the JBR data are not pre-mining, and the JBR data provide no baseline for the permit area. The Division considers the JBR and EarthFax data, and other data dating back to at least 1978, as valid pre-disturbance, pre-mining baseline in relation to the Lila Canyon Extension and as an important part of the required description of the existing, pre-mining hydrologic resources of the permit and adjacent areas. The JBR and EarthFax data alone are not sufficient baseline data, but they are useful and valid baseline data.

The Division has received comments in the past that there are no baseline ground-water monitoring data on the springs to be monitored and that water-elevation data from the IPA piezometers are sporadic – not adequate baseline. In addition to data collected between 1978 and 1996, UEI has submitted at least two years of current quarterly baseline data from the springs, streams, and piezometers – sufficient for a PAP submittal under the guidelines in the Division's Directive Tech 004. Data from October 2002 and earlier are in the PAP; subsequent data have been submitted directly to the Division's database.

The Division has received comments in the past that IPA-1 –2, and –3 are the only potential source of information on water quality in the saturated zone. Because of depth to water and the small diameter of the casing in the IPA piezometers, UEI has determined that it would be impossible to obtain valid water-quality samples from these boreholes (724.100, p. 7). The Division does not share the opinion that obtaining valid samples from these boreholes would be impossible; however - considering the extraordinary cost and difficulties that probably would be involved in obtaining valid water-quality samples under such conditions - the Division is of the opinion that water-quality monitoring from these particular boreholes is not practicable. Further, sampling of water specifically from the IPA piezometers is not necessary to satisfy the requirements of the Coal Mining Rules. There is information on ground-water quality and quantity in the analyses of in-mine flows at the Horse Canyon Mine. There are also data from S-32, located to the south. Water-quality information in the PAP adequately describes the quality of the ground water in the Lower zone in the Lila Canyon Extension of the Horse Canyon Mine.

Monitoring - Inside Vs. Outside the Permit Area Boundary

The Division has received comments in the past that an insufficient number of seeps and springs is being monitored and that the majority are outside the permit area. The number of springs monitored on one side or the other of the permit area boundary is not relevant: the Coal Mining Rules require baseline and operational monitoring of both the permit area and adjacent areas and protection of hydrologic resources both inside and outside the permit area. The Division notes that expanding the permit area to include more springs would lower the performance standard for protection of the added springs from; "minimize disturbance" and "prevent material damage", to simply "minimize disturbance".

The Division has received comments in the past that fourteen EarthFax data points are within the permit area, but data were collected for only one. During the EarthFax survey in 1993 – 1995, data were collected for all fourteen seeps and springs located inside the permit boundary, which is why their existence is documented in Appendix 7-1. Not every site had flow sufficient to obtain valid water-quality samples: many of the fourteen locations referred to in the comments were no more than wet spots some years, and were dry other years. Where flow was sufficient and consistent, water-quality analyses were done for sites representative of water rights and ground-water discharge zones.

Ground-water Emergence Zones – Groups of Springs and Seeps

The Division has received comments in the past that baseline data need to be collected at all springs and seeps, starting immediately. The Coal Mining Rules require a description of the ground-water hydrologic resources: location; extent; ownership; seasonal quantity and quality; discharge, depth, or usage; and additional information deemed necessary and required by the Division. Baseline data sufficient to make this description are in the PAP. Additional, detailed investigation of every aspect of every component of the hydrologic resources is not needed to describe the resources and minimize impacts, or to comply with the Coal Mining Rules.

Water-quality analyses done by EarthFax were representative of the groups of springs and seeps in the respective ground-water discharge zones. Springs selected by UEI for operational monitoring typically have baseline water-quantity and -quality data from the EarthFax survey, have been developed for use by the water right holder, and have the greatest or most consistent flow of the group. At sites that have been selected for operational monitoring, monitoring was resumed in 2001 to establish a continuous record from pre-mining into operational conditions.

Past comments received by the Division proposed that additional baseline data are needed for every single seep or spring identified in earlier surveys, irrespective of use, location, flow, and other existing information about the site and the potential of it's being impacted. Additional baseline monitoring of every point source would provide, at best, marginal information to further describe or define the hydrologic resources of the Lila Canyon Extension in a detail beyond the requirements of the Coal Mining Rules.

The EarthFax survey was done during a three-year period during which the Palmer Hydrologic Drought Index (PHDI) for the region around the Lila Canyon Extension went from wet (1993) to drought (1994) and back to wet (1995). The area is currently in the sixth year of a drought, so, particularly at this time, repeating baseline monitoring for all the sites would be unlikely to produce additional, useful information: the springs that will be monitored during mine operations are presently being monitored to provide continuity of data from pre-mining through reclamation.

The Division has received comments in the past that seeps and springs cannot be treated as systems or groups – each source is a separate resource as regards hydrology, wildlife, and vegetation. The survey results from 1993, 1994, and 1995 in Appendix 7-5 document the seasonal, ephemeral nature of individual discharge locations within a ground-water discharge zone or area: discharge appeared at new, previously dry locations and diminished at some older sites during the three years the EarthFax survey was in progress. This is a typical pattern and has been documented throughout the Book Cliffs and Wasatch Plateau coalfields and many other locations. The springs selected by UEI for monitoring have had relatively consistent flow, and some have been developed by water-right holders to concentrate flow or maintain more consistent flow.

The Division has received comments in the past that L-6-G is adjacent to the Horse Canyon Mine and is not a useful monitoring point. L-6-G has provided pre-disturbance, pre-mining baseline in relation to the Lila Canyon Extension and contributes to the required description of the existing, pre-mining hydrologic resources for the permit and adjacent areas. Because L-6-G has been frequently dry, L-11-G, located approximately 100 yards upstream of L-6-G and representative of the same ground-water emergence zone, was added to the monitoring plan in 2001, and L-6-G was dropped from the monitoring plan in 2003.

Surface Water Information

The Division has received comments in the past that seasonal variation of Lila and Little Park Wash must be shown, and that remote samplers and crest-stage gauges should be used to monitor the intermittent channels.

Channels that drain more than one square mile but have ephemeral flow are included in the intermittent stream definition because the potential flood volumes necessitate application of the stream channel diversion criteria of the Coal Mining Rules (Fed. Reg., vol. 44, no. 50, p. 14932). Classification is to be made at the time of permit application, based on collected data and probable conditions, which helps eliminate skewing by data from unusually wet or dry periods (Preamble to the Federal Rules).

Horse Canyon is an intermittent drainage. Little Park Wash, Lila Canyon, and several other channels in the Horse - Lila Canyon area are intermittent by definition under the Coal Mining Rules because, even though flow is sporadic and typically flashy and characteristically ephemeral, they drain an area greater than one square-mile. No facilities are planned for these intermittent drainages, and there will be no diversions. The sedimentation pond and bypass culvert are to be built in the Right Fork of Lila Wash, the section of the Right Fork above these structures being an ephemeral drainage.

Kaiser installed crest-stage gauges (CSG-1, CSG-2, and CSG-3) in Little Park (Section 651, p. 14) because mine facilities were to be built in or near the channel and therefore information on flow was critical. Appendix 7-2 contains reports on CSG-1, CSG-2, and CSG-3 from 3rd and 4th quarter 1981. Using remote samplers and crest-stage gauges in the Lila Canyon Extension would not provide information relevant to meeting the requirements of the Coal Mining Rules, preventing off-site impacts, facilitating reclamation, or otherwise protecting the hydrologic balance and environment.

Baseline Cumulative Impact Area Information

The Division has received comments in the past that there are insufficient data to prepare the CHIA. Information needed to meet the regulatory requirements of R645-301-725 is available from federal, state, and a number of sources. The Permittee is not required to provide data specifically for the CHIA determination unless none is available from other sources. The Division is not limited to information in the PAP in preparing the CHIA; however, the Division anticipates that data in the PAP will be used along with other information in preparation of the CHIA.

Probable Hydrologic Consequences Determination

The PHC is in Appendix 7-3. Hydrologic resources that might be impacted at the Lila Canyon Extension are identified. The springs and stream channels being monitored in the Lila Canyon Extension area are discussed in the PAP. Comments received by the Division in the past expressed concerns that baseline data are inadequate to prepare the PHC and that potential adverse impacts to a regional aquifer and Range Creek have not been addressed in the PHC.

In preparing the PHC, the permittee used information from the Columbia and Horse Canyon Mines along with baseline data collected for the Lila Canyon Extension. Potential adverse impacts identified in the PHC are:

Contamination from acid- or toxic-forming materials;
Increased sediment yield from disturbed areas;
Increased total dissolved solids concentrations;
Flooding or stream flow alteration;
Impacts to ground-water or surface-water availability;

Hydrocarbon contamination from above ground storage tanks or from the use of hydrocarbons in the permit area;
Contamination of surface and ground water from road salting;
Contamination of surface water from coal spillage due to hauling operations; and
Water consumption.

Section R645-301-728.300 of the Coal Mining Rules requires that the PAP contain specific findings.

728.310. Whether adverse impacts may occur to the hydrologic balance;

Climatological baseline information on average seasonal precipitation, average direction and velocity of winds, and seasonal temperature ranges is presented in Table 7-1A and on page 25 in the PAP. Data are from Sunnyside, Utah, the closest weather recording station.

Overall, information on geology and hydrology is adequate to prepare the PHC. Maps and cross-sections that include the Range Creek drainage have been added to the PAP, and a discussion of the Range Creek drainage has been added to Section 724.200(p. 23) and Appendix 7-3 (pp. 9-10) to help clarify in the public record why regional impacts, particularly adverse impacts to Range Creek drainage, are not expected.

Based on available data and expected mining conditions, UEI has concluded that the proposed mining and reclamation operation is not expected to proximately result in contamination, diminution or interruption of an underground or surface source of water, within the proposed permit or adjacent areas, which is used for domestic, agricultural, industrial, wildlife or other legitimate purpose.

728.320. Whether acid-forming or toxic-forming materials are present that could result in the contamination of surface- or ground-water supplies;

As mining proceeds, materials overlying and underlying the coal seam can be exposed to water and oxygen, both underground and at the surface. There is some potential for generation of acid or toxic drainage; however, rocks of the Mesaverde Group are carbonaceous and persistence of acids and related toxins is unlikely. The refuse pile is designed to handle potentially acid- or toxic-forming materials brought to the surface and minimize the formation of acid- and toxic-forming drainage. Based on the hydrology, geology, and climate of the area and the design of the refuse pile, acid or toxic impacts from materials removed from the mine or from mine water discharge are unlikely (Appendix 7-3, p. 2).

728.330. What impact the proposed coal mining and reclamation operation will have on:
728.331. Sediment yield from the disturbed area;

Sediment controls and a sediment pond will be constructed at the new mine site to minimize impacts, as indicated in the Sediment Control Plan, Appendix 7-4. Drainage ditches and sediment control structures will be constructed according to methodologies and specifications in Appendix 7-4. All construction and upgrading activities will be undertaken during periods of dry weather, commencing in late spring and lasting through fall. For both the mining and reclamation periods, it is expected that construction, upgrading, or regrading activities would cause an increase in sediment load to the stream. Temporary sediment controls will be used whenever possible to lessen the impact of construction activities (Appendix 7-3, p. 2).

> *728.332. Acidity, total suspended and dissolved solids and other important water quality parameters of local impact;*

Before being discharged, water will be held in sumps as long as possible to promote settling. Water will be sampled prior to discharge to ensure compliance with UPDES standards.

Surface waters flow only during a limited part of year, and these waters will be protected by sedimentation ponds and other sedimentation control devices. Construction, operation, and reclamation of the Lila Canyon Mine should not change the total load of dissolved and suspended solids entering the system from the Mancos Shale and other sedimentary strata. Nor should it change the volume of solids stored in the alluvium between flow events. Concentrations may vary locally up and down the channels, but the total load that eventually reaches the Colorado River by way of the various tributaries should neither increase nor decrease.

Data from the Horse Canyon Mine indicate mine-discharge water had higher TDS than the receiving stream. TDS concentrations in Horse Canyon Creek measured at 1,200 to 1,500 mg/L, and TDS in water discharged into the Horse Canyon Mine from the Blackhawk Formation was 2,000 mg/L. Similar concentrations are anticipated for the Lila Canyon Mine and Right Fork of Lila Canyon, so TDS concentrations in flows in the Right Fork of Lila Canyon can increase by a factor of 1.5. Calcite and dolomite will be used as rock dust, so the chemistry of the receiving stream should not be altered (Appendix 7-3, p. 3). On page 4 of the PHC is the statement,

> … The TDS standard for class 4 water is 1,200 mg/l. Hence, if discharges occur from the Lila Canyon Mine to the Right Fork of Lila Canyon, the data indicate that the TDS concentration of these discharges will not exceed the applicable water-quality standard.

This needs clarification: if expected TDS concentration in the discharge is 2,000 mg/L, why does this not exceed a standard of 1,200 mg/L? …Is this based on the receiving stream already containing 1,200 to 1,500 mg/L TDS?

In the event of an accident that spills coal from the trucks, possible impacts to the surface water are increased total suspended solids and turbidity from fine coal particulates that are washed or blown into the channels (Appendix 7-3, p. 12).

The major usable water resources that could potentially be affected in the area are springs that are used by wildlife and livestock. Most of these springs are located upstream of the permit area, or are in areas where subsidence resulting from post-1977 mining is not documented nor expected from operations in the Lila Canyon Extension. The PHC states that, although pre-mining data are not available for the Horse Canyon Mine, available data (Appendices 7-1 and 7-2) indicate there has been no depletion of quantity or quality of surveyed springs in the Horse Canyon permit area, and none is expected in the Lila Canyon area (Appendix 7-3, p. 10).

728.333. Flooding or streamflow alteration;

The sedimentation pond has been designed and will be constructed to be geotechnically stable, minimizing the potential for breaches that could cause downstream flooding. Flow routing through the sedimentation pond and other sediment-control devices will reduce peak flows from the disturbed areas, decreasing the potential for flooding in downstream areas. By retaining sediment on site in the sediment-control devices, the bottom elevations of the Right Fork of Lila Canyon downstream from the disturbed area will not be artificially raised and the hydraulic capacity of the stream channel will not be altered.

Flooding from mine discharge

Streamflow will increase in the Right Fork of Lila Canyon if water is discharged from the mine into the drainage (by way of the sedimentation pond). Potential impacts include the displacement of fines on the channel bottom and widening of the channel. Steady mine-water discharge would most likely result in a more vigorous streambank vegetation, which would reduce the potential for channel widening. Because of infiltration, diversion to a stockwatering pond, and evapotranspiration, mine water discharge is expected to flow less than 4 miles down the channel (Appendix 7-9).

The PHC states that flooding in the downstream channel is unlikely because the maximum expected mine discharge of 500 gpm (1.1 cfs) is significantly below the anticipated 2-year flood of 37 cfs. It isn't clear where this 2-year peak-runoff value came from, as the calculations are not apparent in the PAP; however, the design standard for protection against flooding for a permanent diversion, which applies to the natural channel, is the peak runoff from a 10-yr, 6-hour event (R645-301-742.333). The calculated value for the 10-yr, 6-hr peak flow, based on information in Appendix 7-4, is 29.11 cfs, so expected discharge is still well below flood levels.

Mine discharge rates will depend on mine inflow rates. The PHC states that the Sunnyside Fault is not a large producer of water. The Columbia Mine, located north of the Horse Canyon Mine and closed since the late 1960's, encountered the Sunnyside Fault zone. If water inflow rates were high, the Columbia workings would have flooded. When the Horse Canyon Mine was being pumped, a head differential would have developed between the Columbia Mine and the Horse Canyon Mine. If the fault zone were a good conductor of water, the inflow to the Horse Canyon Mine would have been high, driven by the head from the flooded Columbia Mine Workings. Water levels in the Horse Canyon Mine have not flooded much beyond the water levels that were in the mine while it was pumped.

Comparison of TDS in samples from the Horse Canyon Mine sump locations (2 Dip, Main Slope, 2E-B) with that from springs in the lower stratigraphic section of the Horse Canyon permit area reveals little difference in water quality. Based on the premise that the quality of natural waters generally drops significantly when exposed to mine workings, the PAP states that these TDS concentrations indicate that low-quality water from the flooded Columbia Mine workings did not flow to the Horse Canyon Mine along the Sunnyside fault zone, either because the fault zone is a poor conductor between the two mines or because a substantial head difference was not created when water was being pumped from the Horse Canyon Mine. A third possibility is that water did flow from the Columbia Mine but water quality had not deteriorated as much as would be expected.

Much of the discussion on mine inflow from the Sunnyside Fault is speculative, being based on assumptions about water elevations in the Columbia Mine, which are unknown. The PHC and PAP do not even indicate whether the Columbia Mine workings are at a higher, lower, or equal elevation to those of the Horse Canyon Mine. The most important point is that plans for the Lila Canyon Extension are to avoid intercepting the Sunnyside Fault zone and related ground-water inflow.

Flooding from runoff

Runoff from all disturbed areas and several undisturbed areas will flow through the sedimentation pond or other sediment-control device prior to discharge to the Right Fork of Lila Canyon. The sedimentation pond has been designed to be geotechnically stable, minimizing the potential for breaches that could cause downstream flooding. Flow routing through the sedimentation pond and other sediment-control devices will reduce peak flows from the disturbed areas, decreasing the potential for flooding in downstream areas (Appendix 7-4). Both the principal and emergency spillways discharge directly into the bypass culvert.

The Permittee needs to clarify drainage and sediment control designs for undisturbed drainage UA-5. This drainage is not shown in either Table 4 or Table 5 of Appendix 7-4, and it isn't clear whether it will report to the sedimentation pond or directly to the Right Fork of Lila Canyon.

By retaining sediment on site in the sediment-control devices, the bottom elevations of the Right Fork of Lila Canyon downstream from the disturbed area will not be artificially raised and the hydraulic capacity of the stream channel will not be altered. On the other hand, reducing the amount of sediment can increase the stream's sediment carrying capacity, which can result in stream bank erosion. The outlet of the bypass culvert has been designed to minimize erosion.

The PHC states that reclamation channels have been designed to safely pass the peak flow from a 10-year, 6-hour or 100-year, 6-hour precipitation event, as appropriate. RD-1 and RD-2, respectively the same as DD-11 and DD-12, will remain until Phase 2 bond release (Plate 5-6). Interim sediment-control measures and maintenance of the reclaimed areas during the post-mining period will preclude deposition of significant amounts of sediment downstream.

If subsidence tension cracks reach the surface, they have the potential to locally increase the rate of infiltration into formations overlying the Lila Canyon Mine. The Permittee considers the potential of this happening at Lila Canyon minimal. No hydrologic impacts due to subsidence have been noted at the adjacent Horse Canyon Mine. Also, the shale content of the North Horn, Price River, and the Blackhawk Formations should cause subsidence cracks to heal quickly wherever they become saturated. While the cracks are healing, increased percolation can decrease runoff during the high-flow season because water that normally would have rapidly entered the stream channel might be diverted to the ground-water system. During low-flow periods, increased percolation can result in increased baseflow to streams. The net result will be a decrease in the flooding potential of the affected streams.

There is a potential that flooding of the mine following mining will result in the discharge of water from the portals, but it is unlikely that the ground-water level in the lower ground-water zone will ever rise to the level of any portal location for either the Horse Canyon or Lila Canyon Mines. Because the regional geology and hydrologic regimes of the Horse Canyon and Lila Canyon Mines are so similar, UEI has extrapolated data from the Horse Canyon Mine to the proposed Lila Canyon Mine.

Mine water is not expected to reach the portal level or flow from the reclaimed portals of either the reclaimed Horse Canyon Mine or the Lila Canyon Mine. Mine water levels measured in 1986 and 1993 indicate that there has been little rise in the water level in the Horse Canyon Mine since mining activities ceased. There is a difference in elevation of about 400 to 500 feet between the lowest portal and the approximate water level in the Horse Canyon mine. The proposed Lila Canyon Mine portals are located up-dip from areas in the mine where water may be expected (Figure 7-1, Volume 7) and there should be no natural discharge of ground water through any of the sealed portals. IPA-1, -2 and -3 indicate the local ground-water gradient is away from the portal areas.

If the water level in a mine rises, the head differential between the discharging aquifer

and the mine will decrease, decreasing the inflow rate into the mine. The Lower Sunnyside Coal Seam is underlain by the Sunnyside Sandstone, a marine sheet-sandstone. Porosity and permeability data suggest that if the water level in the mine were to ever approach the level of the portal, the Sunnyside marine sandstone would likely discharge water, preventing any head development behind the portal closures. Much of the Horse Canyon Mine floor has been fractured by the effects of pillar removal, especially near the outcrop, which has probably enhanced the permeability of the underlying Sunnyside Sandstone. The proposed longwall mining in the Lila Canyon Mine is also expected to produce floor fracturing. The resulting increase in permeability would help dissipate head that might develop at the portals. The quantity of water required to reach the portals would need to also be sufficient to saturate a large volume of strata above the mine workings. As a precaution, UEI will incorporate standpipes into the grading plans for the portals at the Lila Canyon Mine so that water levels can be checked annually.

The sedimentation pond will have the potential to discharge to the Right Fork of Lila Canyon. Discharge can include water pumped from the mine. The PAP contains a commitment to evaluate morphology parameters and erosion impacts before water is discharged and at least quarterly during pumping to determine what, if any, streamflow alteration is occurring (Section 728.333, pp. 33-34). Appendix 7-7 includes a characterization of the Right Fork of Lila Canyon that is based on determination of water table elevations in the alluvium and descriptions of biologic communities. Photographs provide a visual record of pre-disturbance conditions. The PHC states on page 11 that it is expected that downstream impacts from pumping water from the mine would be very similar to those experienced in the adjacent Horse Canyon Mine, although pre-mining data are not available for Horse Canyon (Appendix 7-3, p. 10).

728.334. Ground-water and surface-water availability;

Water rights are identified in Section 645-301-727and Table 7-2. The PAP includes information on water rights in and within one mile of the permit area. The locations of those rights are shown on Plate 7-3. The BLM holds the majority of water rights in the area, and the State of Utah and ranchers claim as many water rights, or more, than UtahAmerican. The Permittee commits to repair or replace any state-appropriated water supply damaged by mining operations (Section 727, p. 27). The preferable method of replacement will be sealing of surface fractures affecting the water supply, but piping and trucking water are also possibilities. As a last resort UEI will replace the water by transferring water rights or constructing wells. Most of the water claimed by UtahAmerican is either from Horse Canyon Creek or underground water from the Horse Canyon Mine, so it is not readily available for replacement of other water supplies in the area, which are mostly springs along Patmos Ridge. Water rights 91-4959 (Redden Spring), 91-183 (Horse Canyon Creek), and 91-185 (MDC well), all held by UtahAmerican Energy, are not shown on Plate 7-3.

The PHC states that it is unlikely that alternative water supplies will be needed, as contamination, diminution, or interruption of water resources would not likely occur within the mine permit area. Surface waters flow only a limited part of year and will be provided protection by use of sediment controls. The major water resources that could potentially be affected are the springs that are currently used by wildlife and livestock. Most of these springs are located upstream of the permit area or are in areas where subsidence resulting from post-1977 mining is not documented or expected. No known depletion of flow and quality of surveyed springs exists in the Horse Canyon permit area (although pre-mining data are not available) and none is expected in the Lila Canyon area (Appendix 7-3, p.10).

The springs and stream channels being monitored in the Lila Canyon Extension area are discussed in the PHC and current data have been evaluated in determining the PHC. Water monitoring data for the Horse Canyon Mine - Lila Canyon Extension are in Appendices 7-1, 7-2, and 7-6 of the PAP and Appendix VII-1 of the Horse Canyon MRP: more recent data have been submitted directly to the Division's database.

Perched ground-water systems in the Colton and undifferentiated Flagstaff - North Horn Formations are unlikely to be affected because of the thick section of low-permeability rock, rich in plastic clays that can seal fractures, that lies between them and the coal seam. These perched zones are not extensive or interconnected, so if a fracture does drain one, there will be little or no impact on adjacent zones (Appendix 7-3, p. 9). These perched zones are also typically outside the areas most likely to be subsided.

L-16-G and L-17-G, in Stinky Spring Wash, issue from the Mancos Shale (Plate 7-1A, Table 7-3). They are outside the permit area, outside the limit of subsidence, separated from the proposed mine workings by a fault, and lie several hundred feet below the coal seam. There is no potential for Lila Canyon Mine to negatively impact these springs or their recharge sources (Appendix 7-3, p. 10). At an elevation of approximately 6,000 feet, they are above the water levels measured in the IPA piezometers.

Although some drainages might be intermittent under the definitions in the Coal Mining Rules, flow in the channels of Lila Canyon Wash, Little Park Wash, Right Fork of Lila Canyon, and Stinky Spring Wash has been determined to be ephemeral and flow is in response to precipitation runoff or snowmelt (Section 731.220, p. 41). Streams in the Lila Canyon Extension have been monitored since December 2000, but no flow has been observed.

Range Creek is the perennial stream closest to the Horse Canyon Mine – Lila Canyon Extension. Subsidence is projected to remain within the permit boundary, making it improbable that subsidence would affect any part of the Range Creek drainage. Due to the distance of several miles between the proposed permit area and Range Creek, and the roughly 1,000-feet of low permeability strata between the coal seam and Range Creek, Lila Canyon extension does not present any Probable Hydrologic Consequences to Range Creek (Appendix 7-3, p. 10).

According to the USFWS, water consumption by underground coal mining operations could adversely modify critical habitat and jeopardize the continued existence of several endangered fish species in the Colorado River basin. The USFWS considers consumption to include evaporation from ventilation, coal preparation, sediment pond evaporation, subsidence on springs, alluvial aquifer abstractions into mines, postmining inflow to workings, coal moisture loss, and direct diversions.

- Evaporation from Ventilation - evaporation rates, dependent on temperature and relative humidity, has been estimated at 2.5 gallons per million cubic feet of ventilated air. UEI projects the ventilation rate at 473,040 million cf/yr of air, so water consumption for evaporation would be approximately 1,183,000 gallons/year or 3.63 acre feet/year.

- Coal Preparation – UEI does not anticipate any coal preparation that would result in water usage. Table 2 of the PHC includes consumption of 1,260.000 gal/year in the bathhouse and office. UEI needs to consider the amount of water that will be needed for dust control on coal piles, conveyors, and roads and for other operational uses.

- Sediment Pond Evaporation - Holding time for water in the sedimentation pond is planned to be short, therefore, no significant evaporation loss is expected.

- Subsidence on Springs - Springs will not be adversely effected by subsidence because either springs are located off the permit area and outside the projected zone of subsidence or are protected by 1,000 feet or more of cover. At the Horse Canyon Mine, there were no reported effects on springs due to subsidence during over 45 years on mining in similar conditions.

- Alluvial Aquifer Abstractions into Mines - There will be no water infiltrations from alluvial systems into the mine.

- Postmining Inflow to Workings - The proposed mine openings for Lila Canyon are at an elevation where no surface inflow is possible. Coupled with the sealing plan for the portals, postmining inflows are virtually impossible.

- Coal Moisture Loss – Coal moisture loss or usage is estimated at 4.5 gallons per ton of coal mined. Based on estimated production of 4 million tons/year, water consumption would be 18 million gal/year (55.2 acre feet). Due to low hydraulic conductivities (UEI gives the Blackhawk average as 3.0 x 10-6 cm/sec), ground-water movement, if there is any, is very slow, on the order of centuries to travel a mile. Because of the time it would take for this water to reach the Colorado River drainage were it not consumed during mine operations, it is very unlikely the consumption of this water through mine operations will impact the recovery of the endangered fishes in the Colorado River Basin.

(The PHC refers to Table 1 for hydraulic conductivity values; there is no Table 1 in the PHC, nor a table of hydraulic conductivity values anywhere in the PAP; this apparently refers to a table in some referenced material. UEI needs to identify the source of the hydraulic conductivity information, and either include a Table 1 or revise the text of the PHC.)

- Direct Diversions - no consumption.

Projected losses total 62.71 acre-feet/year (but UEI needs to consider the amount of water that will be needed for dust control on coal piles, conveyors, and roads and for other operational uses), which is below the USFWS mitigation level of 100 acre-feet/year. UEI holds 362.76 acre feet of underground-water rights to offset consumption, although this water is in the sealed Horse Canyon Mine and how UEI would access this is not clear. UEI concludes that water consumption by the Lila Canyon underground coal mining operation will not jeopardize the existence of or adversely modify the critical habitat of the Colorado River endangered fish species.

728.335. Other characteristics as required by the Division;

Comments have been received that the impacts of increased salinity from the solution of salts from the Mancos Shale are not evaluated. Appendix 7-9 includes a calculation of how far the mine discharge of 500 gpm would be expected to flow. Because of infiltration, evapotranspiration, and diversion to a stock pond, the mine discharge is not expected to reach the Price River. This concern is also addressed in other Tech Memos.

728.340. NA

728.350. Whether the UNDERGROUND COAL MINING AND RECLAMATION ACTIVITIES conducted after October 24, 1992 may result in contamination, diminution or interruption of State-appropriated Water in existence within the proposed permit or adjacent areas at the time the application is submitted.

State appropriated water in and adjacent to the proposed permit area is identified in Table 7-2. Some of the appropriated water is within the old workings of the Horse Canyon Mine, other water flows from springs in Horse Canyon and Little Park Wash, particularly along Patmos Ridge. There are also water rights on surface water in Horse Canyon and Little Park Wash.

The PHC states that it is unlikely contamination, diminution or interruption of any water resources will occur within the permit or adjacent areas (p. 10). Surface water flow is limited to

only part of the year, but this flow will be protected by use of sediment controls. Springs, which are used by wildlife and livestock, are the major water resources potentially affected. To date, no known depletion of flow and quality has occurred at springs in the Horse Canyon permit area, and none is expected in the Lila Canyon area. Most springs are located upgradient of the permit area or in areas where subsidence resulting from post-1977 mining is not expected. Pre-mining data are not available for Horse Canyon, but depletion problems from subsidence are not indicated by sampling results in Appendices 7-1 and 7-2.

UEI feels it is unlikely an alternative water supply will be needed, but commits to replace or repair, as soon as practical, any state-appropriated water supply damaged by mining operations. This may include sealing surface fractures, piping, trucking water, or construction of wells. The UEI has rights to 1.50 cfs of water in this area, and the PAP states UEI is prepared to replace the water by transferring water rights (Section 727, pp. 27-28).

Findings:

R645-301-724.100, The Permittee must update the Lila Canyon Extension PAP to include the approved post-mining land use change, including the future transfer of the Horse Canyon Well to CEU.

R645-301-121.200, The PHC refers to Table 1 for hydraulic conductivity values; there is no Table 1 in the PHC, nor a table of hydraulic conductivity values anywhere in the PAP; this apparently refers to a table in some referenced material. UEI needs to identify the source of the hydraulic conductivity information, and either include a Table 1 or revise the text of the PHC.

R645-301-728.334, In the estimates of water consumption in the PHC, UEI must also consider the amount of water that will be needed for dust control on coal piles, conveyors, and roads and for other operational uses.

R645-301-722.100, The condition of Horse Canyon Well is briefly described in the supplemental information accompanying the December 6, 2002 submittal, but UEI needs to include this information in the description of the well in the PAP.

R645-301-741, The Permittee needs to clarify drainage and sediment control designs for undisturbed drainage UA-5. This drainage is not shown in either Table 4 or Table 5 of Appendix 7-4, and it isn't clear whether it will report to the sedimentation pond or directly to the Right Fork of Lila Canyon.

R645-301-624.100, Reference is made in Section 724.100 (p. 19) to Appendix 7-7 for information on the relationship of the Stinky Seeps to faulting, but Appendix 7-7 contains no discussion of this subject. The Permittee needs to either clarify the

reference in Section 724.100 (p. 19) or include in Appendix 7-7 information on the relationship of these seeps to faulting.

R645-301-624.100, -721, The Stinky Seeps are at an elevation of approximately 6,000 feet, close to the elevation of the potentiometric surface (Plate 7-1), so the source for the water flowing from these seeps could be connected to the saturated zone that will be intercepted by the proposed mine. In Appendix 7-3 (p. 10), UEI states, "…being 500 to 600 feet below the coal seam, there is no potential for Lila Canyon Mine to negatively impact this spring or recharge sources." Because they are below the coal seam, subsidence should not impact these springs, but recharge or flow to these seeps could be impacted more directly by mine operations. The Permittee needs to more fully evaluate the hydrogeology of these seeps, whether their source is regional, intermediate, or local in extent, and what impacts the proposed coal mining might have on them.

R645-301-751, The statement on page 4 of the PHC needs clarification,

> … The TDS standard for class 4 water is 1,200 mg/l. Hence, if discharges occur from the Lila Canyon Mine to the Right Fork of Lila Canyon, the data indicate that the TDS concentration of these discharges will not exceed the applicable water-quality standard.

Expected TDS concentration in the discharge is 2,000 mg/L; why does this not exceed a standard of 1,200 mg/L?

MAPS, PLANS, AND CROSS SECTIONS OF RESOURCE INFORMATION

Regulatory Reference: 30 CFR 783.24, 783.25; R645-301-323, -301-411, -301-521, -301-622, -301-722, -301-731.

Analysis:

Coal Resource and Geologic Information Maps

Depth to the Sunnyside Seam, the seam to be mined, is shown on the Cover and Structure Map on Plate 6-4. Thickness of the Sunnyside Seam is shown on the Coal Thickness Isopach map on Plate 6-3. Thickness and nature of the Sunnyside Seam, of coal or rider seams above the Sunnyside Seam, and of the stratum immediately below the Sunnyside Seam are shown on the Coal Sections on Plate 6-5.

Plate 6-1 shows surface geology, including coal crop lines, and the strike and dip of the Sunnyside Seam within the proposed permit area. Plate 7-1A shows the geology of a larger area,

including the Range Creek drainage, along with location of surface- and ground-water monitoring points in and adjacent to the Horse Canyon and Lila Canyon permit area. The cross section on Figure 7-1 (Volume 7) shows the rock tunnels, the dip of the strata, stratigraphy, and expected ground-water elevation. Plate 7-1B shows the geologic cross section extending from Lila Canyon to Range Creek, including a projection of the water level indicated in the IPA piezometers. Figures VI-1 and VI-2 portray the general stratigraphy of the permit and adjacent areas.

Elevation contours on the Sunnyside Seam as determined from the outcrop and bore holes are on Plates 6-2 and 6-4. The plates indicate that the coal seam crops out at approximately 6,500 feet in the vicinity of the rock-slope tunnels. The tunnels will intercept the coal seam at approximately 6,300 feet (Figure 7-1, Volume 7). Plate 6-3 shows coal thickness isopachs.

Depth of cover ranges from 1,500 to 2,300 feet according to Section 525.120 (p. 34) of the Subsidence Control Plan. Dirt roads are in areas with over 1,000 feet of cover or in area that will not be subsided. Part of Little Park Wash has less than 1,000 feet of cover (p. 35). Plate 5-5 shows it is less than 1,500 feet over a large part of the mine, which agrees with statements in Section 6.3 (p. 10). In places where the planned workings are near the escarpment, Plate 5-5 shows cover thickness is on the order of 500 feet. Deeper coal is generally to the east and north (Section 6.3.)

Fault locations and offsets are shown on Plate 6-1 and discussed in the text. Fault traces are not always visible at the surface, and fault locations on Plates 6-1 and 6-2 are also based on exposures at the outcrop, faults encountered in the Geneva Mine, and information from drilling (Section 6.5.3.3, p. 24). Interpretations of fault alignments, which are based on detailed mapping by Kaiser Corporation consultants, differ slightly from those on maps published by the others (Section 6.4.2, p. 10), including the USGS. Aside from differences in detail, these sources agree on general location, extent, and magnitude of the faults.

The Sunnyside Fault, shown on Plates 6-1 and 6-2 of the Lila Canyon PAP and Plate II-2 of the current MRP, limited mining to the east in the Horse Canyon Mine. The Permittee believes it lies east of the proposed Lila Canyon Extension (Section 6.5.3.3, p. 24). On Plates 6-1 and 6-2, the PAP indicates the Sunnyside Fault dies out near the northeast corner of the Lila Canyon Extension.

Most maps and cross sections in the PAP extend as far as Patmos Ridge but include only a small portion of the Range Creek drainage. Geologic maps and cross sections that extend from the Book Cliffs to the Range Creek drainage have been added to the PAP.

Mine Workings Maps

Plate 5-1 shows the mine workings in and adjacent to the permit area, the Horse Canyon and Old Book Cliffs mines. There was a ventilation portal for the Horse Canyon Mine in Lila Canyon (Section 521.111, p. 19).

Monitoring and Sampling Location Maps

Elevations and locations of test borings and outcrop measurements are on Plates 6-2, 6-3, 6-4, and 6-5. Piezometers IPA-1, IPA-2, and IPA-3 are shown on Plates 7-1 and 7-4. Elevations and locations of seeps and springs monitored in 1985 by JBR and in 1993-1995 by EarthFax are on Plate 7-1.

Horse Canyon Mine UPDES discharge points UT022926 - 001, - 002, and - 003 (monitored from 1979 to 1991) are on Plate 7-1. Currently monitored UPDES discharge points, UT040013- 001A and - 002A are shown on Plates 7-1 and 7-4. Proposed UPDES points L-4-S and L-5-G are on Plate 7-4.

Locations for surface-water monitoring points HCSW-1 (HSW-1, HC-1), HCSW-2, HCSW-3, B-1 (HC-2), and RF-1 are shown on Plate 7-1. Locations for baseline and operational water-monitoring sites added for the Lila Canyon Extension are on Plate 7-4.

Subsurface Water Resource Maps

Many maps and cross sections in the PAP include only a small portion of the Range Creek drainage, which covers a large area east of the Horse Canyon Mine and Lila Canyon Extension. Geologic maps and cross sections that extend from the Book Cliffs to Range Creek have been added to the Lila Canyon Extension PAP (Plates 7-1A and 7-1B).

Water-level elevation contours are on Plate 7-1. Water levels for the IPA piezometers are tabulated in Appendix 7-1. The data do not evidence seasonal variations. The Permittee has portrayed variations of head on a contour map in Figure 7-1 (Volume 6) and shown them graphically in Figure 7-2.

The MDC Well in NW Section 9 of T. 16 S., R. 14 E., near the road junction, is listed in Table 7-2 - Water Rights. The Horse Canyon Well is located nearer the Horse Canyon Mine surface facilities (Section 724.100, pp. 5-6). These wells were installed in a small alluvial aquifer at the mouth of Horse Canyon. They are discussed in Section 724.100 and shown on Plate 7-1.

The ground-water elevation in the Horse Canyon Mine, at the rotary car dump at the intersection of the Main slope and 3rd level, is described in Section 724.100 (pp. 11-12). The

elevation was approximately 5,800 feet in 1986. This projected ground-water elevation was used in projecting where mining will intercept water, but not in mapping the approximate piezometric surface on Plate 7-1. The location of the dump is described in the text and is shown on Plate 7-1. Underground exploration work performed by BXG in 1993 found water in the Horse Canyon Mine at approximately 5,870 feet. The location for the measurement is on Plate 7-1. The potentiometric surface on Plate 7-1 is closely congruent to the 1993 BXG measurement in the Horse Canyon Mine, although this point does not appear to have been used in projecting that surface. The PAP states that the level measured by BXG is probably representative of water level in the rest of the Horse Canyon Mine.

Water rights are listed in Table 7-2. The list includes Redden Spring, plus springs identified as Mont, Leslie, Cottonwood, Williams, Kenna, and two Pine springs (Kenna Spring is in the Range Creek drainage.) In addition, there are eleven unnamed springs listed, plus the MDC well and three rights associated with underground tunnels of the Horse Canyon Mine. Locations are on Plate 7-3. Surface and subsurface water rights for nearby portions of the Range Creek drainage are listed in Table 7-2 and shown on Plate 7-3. Water rights 91-4959 (Redden Spring) and 91-185 (MDC well), both held by UtahAmerican Energy, are not shown on Plate 7-3.

Surface Water Resource Maps

Locations of streams and seeps and springs are shown on Plate 7-1. There are no known perennial streams, lakes or ponds within the permit and adjacent areas. Table 7-2 lists water rights and Plate 7-3 shows locations of these water rights. Water right 91-183 (Horse Canyon Creek), held by UtahAmerican Energy, is not shown on Plate 7-3. The nearest perennial stream is Range Creek, located several miles east of the Lila Canyon area. Most maps and cross sections in the PAP include only a small portion of the Range Creek drainage, but geologic maps and cross sections that extend from the Book Cliffs to Range Creek have been added to the Lila Canyon Extension PAP (Plates 7-1A and 7-1B).

The PAP includes information on water rights in and within one mile of the permit area. The locations of those rights are shown on Plate 7-3.

Well Maps

Locations are shown on Plate 7-1. Three exploration boreholes, IPA-1, IPA-2 and IPA-3, were converted to piezometers to monitor water levels in the area. The MDC and Horse Canyon wells were completed as water wells in the alluvium at the mouth of Horse Canyon. S-32 was completed as a piezometer in the lower Grassy Member and Upper Sunnyside Seam of the Blackhawk Formation.

One oil exploration hole was drilled south of the proposed Lila Canyon permit area, in Section 25, T. 16 S., R 14 E., SLM, by Forest Oil Company. The location of the hole is shown on Plate 6-2. According to the Division's records, the well was completed in October 1959. No oil, gas, or water was reported. The well was drilled to a depth of 12,602 feet. It spudded in the Price River Formation and was in that formation to a depth of 370 feet then passed through the Blackhawk Formation from 370 feet to 906 feet, a thickness of 536 feet.

Exploratory boreholes S-26, S-28, and S-31 (Plate 6-2), located south of the Williams Draw Fault, were offset with shallow piezometers A-26, A-28, and A-31 intended for ground water in the alluvium of Little Park (Table 6-3). These piezometers have been plugged and abandoned and are not shown on maps in the PAP.

Findings:

R645-301-724.100, 724.200, UEI must show water rights 91-4959 (Redden Spring), 91-183 (Horse Canyon Creek), and 91-185 (MDC) on Plate 7-3.

R645-301-722.300, 731.700, to make Plate 7-1A accurate and consistent with statements in the MRP and with the legend on the plate itself, UEI must show the Lila Canyon Mine surface- and ground-water monitoring points on Plate 7-1A.

OPERATION PLAN

HYDROLOGIC INFORMATION

Regulatory Reference: 30 CFR Sec. 773.17, 774.13, 784.14, 784.16, 784.29, 817.41, 817.42, 817.43, 817.45, 817.49, 817.56, 817.57; R645-300-140, -300-141, -300-142, -300-143, -300-144, -300-145, -300-146, -300-147, -300-147, -300-148, -301-512, -301-514, -301-521, -301-531, -301-532, -301-533, -301-536, -301-542, -301-720, -301-731, -301-732, -301-733, -301-742, -301-743, -301-750, -301-761, -301-764.

Analysis:

General

The Permittee has based the ground-water and surface-water monitoring plans on the PHC determination and the analysis of baseline hydrologic, geologic, and other information in the proposed amendment (Section 731.221, p. 44). The surface- and ground-water monitoring sites will be monitored quarterly through the operational and reclamation periods to document any diminution or damage to the hydrologic balance. Water samples from seeps, springs, and streams will be analyzed for the parameters listed in Tables 7-4 and 7-5. The parameters in

Tables 7-4 and 7-5 match the operational parameters in the Division's Directive Tech 004. Monitoring reports will be submitted to the Division at least every three months, within 30 days following the end of each quarter (Section 731.220, p. 43).

The proposed Lila Canyon Extension includes a commitment to analyze ground- and surface-water samples for baseline parameters preceding each 5-year permit renewal. These permit-renewal baseline analyses will be done for the surface-water samples collected at either high or low flow and for the spring samples collected at low flow during that year (Section 731.200, p. 37).

The Permittee's water-monitoring plan is intended to provide data to show impacts to potentially affected springs, seeps, impoundments and drainages within and adjacent to the permit area by comparison with relevant baseline data and with applicable effluent limitations. The Permittee has selected monitoring locations and frequencies, described in Table 7-3, so that significant springs, seeps, impoundments and drainages that could potentially be impacted by the mining and reclamation operations will be monitored on a regular basis (Section 731.222, p. 45).

Groundwater Monitoring

Section 731.211 discusses the ground-water monitoring plan. It makes reference to water rights on several of the springs to be monitored. Section 731.212 states that when analyses of ground water indicate non-compliance with permit conditions, the operator will promptly notify the Division and take the actions provided for in (R645-300-)145 and (R645-301-)731. No springs or seeps are located within the disturbed area or near the proposed surface facilities (section 724.100, p. 8).

The Division has received comments in the past that the number of seeps and springs being monitored is not sufficient, most of them are outside the permit, and one spring in the permit area is not sufficient. Determination of the permit area is not based on hydrologic systems. The Coal Mining Rules require protection of resources both inside and outside the permit area, and baseline and operational monitoring of both the permit area and adjacent areas. The Division notes that expanding the permit area to include more springs would actually lower the performance standard for protection of the added springs from; “minimize impact” and “prevent material damage”, to simply “minimize impact”.

The seeps and springs selected by UEI for monitoring are representative of the springs and seeps in the ground-water emergence zones located over or adjacent to the area of proposed mining. Additional, detailed investigation of every aspect of every component of the hydrologic resources is not needed to monitor the resources and minimize impacts, or to comply with the Coal Mining Rules. Springs initially selected typically have baseline water-quantity and -quality data from the EarthFax survey, have been developed for use by the water right holder, and have

the greatest or most consistent flow of the group or zone. As the mine plan has developed, springs have been added or removed to optimize the effectiveness of monitoring.

Monitoring was resumed at spring locations L-6-G through L-10-G in 2000 to establish a continuous record from pre-mining into operational conditions. Baseline monitoring for L-11-G and L-12-G was initiated in October 2001. L-11-G has replaced L-6-G, which was dropped from the plan in 2003. Seeps in Stinky Spring Canyon at the southwest corner of the Lila Canyon Extension area were added to the monitoring plan in 2002 (L-16-G and L-17-G). Monitoring of L-10-G ceased in the first quarter of 2003 because it was considered too far outside the permit area to be of any benefit.

The PAP states there are 13 ground-water monitoring sites proposed for the Lila Canyon Extension (Section 731.211, p. 38), but that number includes sites L-6-G and L-10-G that have been abandoned since the PAP was first written, so there are only 11 sites proposed for operational monitoring (Table 7-3). Sites L-5-G, L-7-G, L-8-G, L-9-G, L-11-G, L-12-G, L-16-G, L-17-G and IPA-1, -2, and –3 are the eleven sites currently proposed for ground-water monitoring. These are described in Section 731.211 and listed in Table 7-3. Locations are shown on Plate 7-4. Data collected up through October 2002 are in Appendix 7-1. More recent data have been submitted directly to the Division's database. Station L-5-G is the potential mine discharge point and will be monitored in accordance with UPDES Permit requirements. IPA-1, -2, and -3 will be monitored quarterly for water levels (Section 731.211, p. 40).

L-7-G, L-8-G, L-9-G (Pine Spring), and L-10-G (William's Draw Spring), correspond with the springs monitored by EarthFax as 9, 10, 16(Z), and 14, respectively. L-12-G corresponds roughly with EarthFax springs 11 and 12, but does not coincide exactly with either one. Appendices 7-1 and 7-6 of the Lila Canyon Significant Revision contain water-quality data on springs 9,10, 14, and 16(Z) from 1993, 1994, and 1995, when they were monitored for baseline for the South Lease by IPA. There are field data on springs 11 and 12 but no water-quality analyses were done.

L-6-G (H-18) is downgradient from water rights 91-617 (Mont Spring) and 91-618 (Leslie Spring). These water rights correspond closely to JBR sites H-21 and H-19 and are near H-20, H-21A, H- 21B, and H-22. The Permittee selected H-18 as the location for L-6-G because it is the lowest spring in the group; however, this location has been dry during recent monitoring, so L-11-G, located approximately 100 yards up the drainage, has been added to replace L-6-G. Spring L-11-G corresponds with sites H-18A and H-18B. There are no data in the PAP on H-18A and H-18B, but from Plate 7-1, these appear to be in the same alluvial system that was monitored at L-6-G.

Spring L-7-G, monitored as spring 9 (or S-9) from 1993 to 1995, is near springs 8, 19-A, and 19-B (Plate 7-1) and has had consistent flow. Baseline data for these springs are in Appendices 7-1 and 7-6. Spring 9, or more likely this group of springs, has also been called

Cottonwood Spring (Section 731.211, p. 39), which is associated with water right 91-2521 in Table 7-2. However, Plates 7-1 and 7-3 indicate water rights 91-399 and 91-2537 are located in this group of springs, while water right 91-2521 is located on an adjacent topographic high (NE/4 Sec. 13, T. 16 S., R. 14 E.).

A water-monitoring program was implemented in 2000 to determine if the springs proposed for operational monitoring were still viable and to establish a current baseline that would be continuous with operational monitoring. Additional sites were added in 2001 and 2002. Data collected through October 2002 are in Appendix 7-1, and the most recent data are in the Division's database.

Baseline water levels for 1994, 1995, and 1996 have been established at three points: IPA-1, IPA2, and IPA3. In December 2000, UEI was able to measure the water level in IPA-2, but at IPA-1 and IPA-3 the probe was not able to go far enough into the piezometers to reach water (Section 731.513, p. 52). Water monitoring reports indicate the piezometers were not accessible in February 2001. UEI successfully measured water levels in all three piezometers on May 15, 2001 and each quarter since. Data collected through October 2002 are in Appendix 7-1, and the most recent data are in the Division's database.

Map 7-1, based on data from several sources, shows potential ground-water levels and where UEI anticipates the mine workings might intercept ground water. If mine water interception occurs, the water will be stored in sumps and used in the mine and, if necessary, discharged from the mine. Eventually, the mine may intercept the three IPA piezometers, so in addition to the three piezometers, UEI commits in to the monitoring of underground usage and discharge to more accurately define potential impacts on ground water (Section 731.513, pp. 52-53).

Ground water will be monitored and data will be submitted at least every three months for each monitoring location. Monitoring submittals will include analytical results from each sample taken during the approved reporting period. When the analysis of any ground-water sample indicates noncompliance with the permit conditions, then the operator will promptly notify the Division and immediately take the actions provided for in 145 and 731 (Section 731.212, pp. 40-41). Ground-water monitoring will continue through mining and reclamation until bond release (Section 731.214, p. 41).

Equipment, structures and other devices used in conjunction with monitoring the quality of ground water on-site and off-site will be properly installed, maintained and operated and will be removed by the operator and when no longer needed (Section 731.215, p. 41).

Contamination of perched ground water in the Price River and Colton Formations is unlikely because the perched zones are several hundred feet above the Lower Sunnyside Coal

Seam, and low-permeability strata separate the perched ground-water zones from the coal seam. The perched ground water will not be intercepted by mining activities

Surface Water Monitoring

Section 731.222 discusses the surface-water monitoring plan. The monitoring data will be used to determine the impacts of mining on the hydrologic balance by comparison with relevant baseline data and applicable effluent limitations.

Sediment pond and mine discharges will be monitored monthly or as frequently as discharges occur (Table 7-3). Appendix 7-5 contains a copy of the UPDES permit for the Lila Canyon Extension. The UPDES permit was issued in 1999.

Drainages in the area flow in response to snowmelt and precipitation events (Section 724.200, p. 20). The proposed surface-water monitoring program will monitor the Lila Canyon drainage both above and below the disturbed mine site area at L-1-S, L-2-S, and L-3-S and the sediment pond discharge at L-4-S.

L-1-S, L-2-S, L-3-S, and L-4-S have been monitored monthly since July 2000, and a summary of field observations through October 2002 is in Appendix 7-1. Most reports are “no flow”. "No access" is frequently reported December through February, but once the mine begins operation, all sites will be more accessible. In any quarter, a minimum of three attempts will be made to access water monitoring sites, using either 4-wheel drive vehicles or ATVs, before reporting "No access"; however, safety and common sense will prevail while making such attempts (Section 731.220, p. 43).

Locations of all monitoring sites are shown on Plate 7-4, "Water Monitoring Location Map." Proposed monitoring methods, parameters and frequencies are described in Table 7-3, "Water Monitoring Stations," and Table 7-4, "Water Monitoring Parameters." The operational water-monitoring plan will be implemented upon approval of the MRP.

The proposed surface-water monitoring plan is detailed in Section 731.220. The plan provides for monitoring of parameters that relate to the suitability of the surface water for current and approved postmining land uses and to the objectives for protection of the hydrologic balance as set forth in R645-301-751 (Section 731.221, p. 44). Parameters are listed in Table 7-4. Surface-water monitoring will continue through mining and reclamation until bond release (Section 731.224, p. 45).

Discharges of water from this operation will be made in compliance with all Utah and federal water quality laws and regulations and with effluent limitations for coal mining promulgated by the Environmental Protection Agency (EPA) set forth in 40 CFR Part 434 (Section 752, p. 71).

Equipment, structures and other devices used in conjunction with monitoring the quality and quantity of surface water on-site and off-site will be properly installed, maintained and operated and will be removed by the operator when no longer needed (Section 731.225, p. 45).

Acid- and Toxic-Forming Materials and Underground Development Waste

Two rock slopes driven upward from the base of the Book Cliffs to the coal seam will provide access to the underground workings of the Lila Canyon Mine. Rock that will be removed from the tunnels is designated as "rock-slope material" or "mine development waste" and it fits into the classification of underground development waste. Rock-slope material / mine-development waste will contain mostly shale, sandstone, and mudstone. Traces of coal may be found (Section 520, p. 17). Rock-slope material/ mine development waste will be used to fill in some low areas to be used as pads (Section 537.200, p. 53), referring to the shop-warehouse concrete pad that will extend onto the rock-slope structural-fill portion of the refuse pile (Section 528.320,p. 45; Plate 5-2).

The refuse pile has been designed as a location for the storage and disposal of coal processing waste (Section 528.320, p. 45) and underground development waste that is brought to the surface, including any excess slope-rock material or underground development waste not used as fill (Section 520, p. 16;); it is not anticipated by UEI that any underground waste other than the slope-rock will be brought to the surface (Section 536, p. 51). Coal processing waste from the crusher will be placed in the refuse pile (Section 528.321, p. 45); however, this will not be in the portion to be used as a pad for the mine buildings (Section 528.320, p. 45). The designed capacity of the pile is 44,400 yd^3 (p. 18), which is in excess of projected needs. The areas in the refuse pile for rock-slope fill and for coal-mine waste are adjacent and conjoining and will be treated as one area or structure (Section 528.320, p. 45; Plate 5-2). Appendix 5-7 provides more detailed information on construction, operation, and reclamation of the refuse pile.

Material not transported to the surface, such as overcast material, rock falls, and slope material may be disposed of underground according to the appropriate MSHA regulations (Section 513.300, p. 3). Because this will be an underground mine there will be no spoil.

The Permittee has committed that the underground development waste to be placed in the refuse pile will be examined and tested as necessary to determine acid- and toxic-forming potential (Section 536, p. 51). Samples will be collected and analyzed a minimum of five times during construction of the rock-slope tunnels, and from every 6,000 tons of waste rock placed on the refuse pile during mine operation (Appendix 5-7, p. 3). According to Appendix 5-7, page 3, the parameters to be determined are in Table 2, but there is no Table 2 in Chapter 2, Chapter 5, or Appendix 5-7.

The Coal Mining Rules require that coal-mine waste, which includes the slope-rock material and underground development waste, be disposed of in an approved disposal area such as the refuse pile. At a minimum, the material in the refuse pile must be covered with 4 feet of nontoxic and noncombustible material. The PAP reclamation plan specifies 4 feet of subsoil and topsoil will be placed over the refuse pile. This includes the slope-rock underground development waste used to build the pads, which will be left in place for final reclamation and buried with 4 feet of subsoil and topsoil (Section 553.300, p. 59; Section 731.311, p. 46; Appendix 5-7, p. 3).

Some statements in the MRP could be more precise in their language and can seem contradictory and confusing if read outside the context of the entire MRP. For example, it can be inferred from Section 537.200 (p. 53) that some waste might be placed outside the designated refuse pile in indeterminate, undesignated "low areas"; from Section 537.250 that slope rock material might be used in pads other than the shop-warehouse pad, then left there and reclaimed "in place"; and from Section 537.240 that there might be more than one waste pile. In spite of such unfocused language regarding some details, the overall plan for handling, storage and disposal of coal mine waste and reclamation of one, unique refuse pile is sufficiently clear and meets the requirements of the Coal Mining Rules.

Gravity Discharges From Underground Mines

The proposed access portals are below the coal outcrop, as shown on Figure 7-1 (Volume 7) and Plates 5-2 and 7-5. The fan is to be located on the outcrop, above the portals. The two 1,227-foot access tunnels will slope up at approximately 12 percent, from a starting elevation at the surface of approximately 6,150 feet. The intersection of the coal seam and the rock slope will take place at approximately 6,300 feet elevation (Section 520, p. 17). Ground-water elevations are static at approximately 5,990. (Note: Maximum ground-water elevation measured in the three IPA piezometers is 5,973 feet, and maximum projected elevation in the vicinity of the rock-slope tunnels on Plate 7-1 is approximately 6,000 feet). Ground-water levels would need to rise approximately 310 feet to reach the intersection of the tunnels with the coal seam at 6,300 feet (and 160 feet just to reach the starting elevation of the tunnels at the base of the Book Cliffs at 6,150 feet), so it is unlikely water levels will ever reach the intersection of the tunnel and coal seam. (Section 521.321, pp. 53-54). (It is also unlikely the rock slopes will intercept ground water in the Blackhawk Formation.) Gravity discharge from the mine is unlikely.

Water-Quality Standards And Effluent Limitations

Water monitoring parameters are shown in Table 7-4. Water monitoring locations and sample frequencies are described in Table 7-3 and on Plate 7-4.

Sedimentation pond discharge will be conducted in accordance with 40 CFR Parts 122 and 123, R645-301-751 and as required by the Utah Division of Water Quality (UDWQ) for

UPDES permits (Section 742.112, p. 60). A UPDES discharge permit has been issued by the UDWQ for the proposed sediment pond and mine water for the Lila Canyon operation (Appendix 7-5).

As indicated in Section 731.220 (p. 43), surface-water monitoring data will be submitted to the Division at least every three months. When analysis of any surface-water sample indicates non-compliance with the permit conditions, UEI will promptly notify the Division and immediately take action to identify the source of the problem, correct the problem and, if necessary, to provide warning to any person whose health and safety is in imminent danger due to the non-compliance (Section 731.223, pp. 44-45).

Diversions: General

Ditch DD-7 and culvert DC-7 carry water to the edge of undisturbed area UA-6, but the flow path from there to ditch DD-12 isn't indicated on maps or plans. There needs to be a ditch and an associated disturbed area added to Plate 7-2, and other plates as appropriate.

Diversions: Perennial and Intermittent Streams

Section 742.333 (p. 67) states that all temporary diversions are designed to safely pass the peak runoff of a 2 year - 6 hour precipitation event, and refers to Appendix 7-4 for details. Designs in Appendix 7-4 are based on a 10-yr, 6-hr event. This itself is not a problem as the designs in Appendix 7-4 are therefore more robust than indicated in Section 742.333, but the discrepancy needs to be corrected.

Casing and sealing of wells

IPA-1, -2, and –3 will be reclaimed according to the Division's performance standards (which are the Coal Mining Rules). If any wells are installed in the future, the requirements of R645-301-765 will be met (Section 765).

As part of the post-mining land use change approved by the Division on January 6, 2004, the Horse Canyon Well is to be transferred to CEU as a potential source of culinary water for the Utah universities science field camp. According to R645-301-731.400, the permittee retains responsibility for proper management of this well until bond release. (What constitutes "proper management" is not explained, but R645-301-765 – Permanent Casing and Sealing of Wells indicates the permittee retains the obligation to seal, cap, backfill or otherwise properly manage "as required by the Division in accordance with R645-301-529.400, R645- 301-631.100, and R645-301-748", so "proper management" does not seem to apply to maintenance or operation of the well but rather to permanent closure done before bond release.)

Findings:

R645-301-742.333, The Permittee needs to clarify what precipitation events are used in the designing of diversions. Section 742.333 on page 65 states peak runoff of a 2 year - 6 hour precipitation event as used; designs in Appendix 7-4 are based on a 10-yr, 6-hr event. The designs in Appendix 7-4 are therefore more robust than indicated in Section 742.333, but the discrepancy in the text on page 65 of Chapter 7 (and anywhere else in the PAP a similar statement appears) needs to be corrected.

R645-301-731.200, The PAP states (Section 731.211, p. 38) that there are 13 ground-water monitoring sites proposed for the Lila Canyon Extension, but that number includes sites L-6-G and L-10-G that have been abandoned since the PAP was first written. There are currently only 11 sites proposed for operational monitoring (Table 7-3). The Permittee needs to update page 38 to indicate the number of ground-water sites to be monitored.

R645-301-121.200, -731.311, According to Appendix 5-7, page 3, Refuse Testing, the parameters to be determined for the materials to be placed in the refuse pile are in Table 2, but there is no Table 2 in either Chapter 2 or 5 or Appendix 5-7. UEI needs to identify the parameters and update Appendix 5-7 to correctly identify where they are listed in the PAP.

R645-301-232, -722.200, -742.123, Ditch DD-7 and culvert DC-7 carry water to the edge of undisturbed area UA-6, but the flow path across this "undisturbed" area to ditch DD-12 isn't indicated on maps or plans. Maps and plans need to show a continuous flow path from ditch DD-7 and culvert DC-7 to ditch DD-12, along with the associated disturbed corridor.

CUMULATIVE HYDROLOGIC IMPACT ASSESSMENT

Regulatory Reference: 30 CFR Sec. 784.14; R645-301-730.

Analysis:

The CHIA for this submittal has not been prepared yet. The Division has received comments in the past that there are insufficient data to prepare a CHIA for the Horse Canyon Mine – Lila Canyon Extension area. Data are available from federal, state, and a number of sources. The Permittee is not required to provide data unless none is available from other sources. The Division is not limited to information in the PAP in preparing the CHIA; however,

it is anticipated that data in the PAP will undoubtedly be used along with other information in preparation of the CHIA.

The Division has received comments in the past that the discharge area for the regional aquifer is not identified. The potential for discharge from a regional aquifer will be considered in the CHIA.

The Division will provide an assessment of the probable cumulative hydrologic impacts (CHIA) of the proposed operation, and all anticipated mining, upon surface- and ground-water systems in the cumulative impact area. The CHIA will be sufficient to determine, for purposes of permit approval, whether the proposed operation has been designed to prevent material damage to the hydrologic balance outside the permit area. The Division will use data and analyses from several sources, including those submitted by UEI in the Lila Canyon Extension PAP.

Findings:

The CHIA for this submittal has not been completed yet.

RECOMMENDATIONS:

This amendment should not be approved for inclusion in the MRP until the deficiencies identified in this TA have been adequately addressed.

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